

**LOHAS (LIFESTYLE OF HEALTH AND SUSTAINABILITY) SCALE  
DEVELOPMENT AND VALIDATION**

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*To my family, Prof. Moon, Prof. Feinberg and those whom I remember for their sincere support  
along this journey.*

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## **ABSTRACT**

LOHAS stands for “Lifestyle of Health and Sustainability”. LOHAS describes an emerging new lifestyle that is defined by attention to health and well-being and, environmental sustainability. The problem with the introduction of a description of a lifestyle that is supposed to capture broad social, political, economic, and behavioral changes is that the discussions of this lifestyle have moved faster than any research to support it. The validity and the conceptual richness and implications of the LOHAS can only proceed if there is a reliable and valid instrument to measure the LOHAS lifestyle; and there isn't. The research focuses on the development of a reliable and valid LOHAS scale. The proposed research consists of five studies; specification of domain of the LOHAS, item generation, measurement purification, reliability assessment and validity assessment. This research will contribute to the understanding of the nature of LOHAS and provide a variety of theoretical and practical applications.



# CHAPTER 1. INTRODUCTION

## 1.1 Background

Over the last several decades, there has been an increased interest in quality of life issues (e.g., Kasser et al., 2014; Schalock, Bonham & Marchand, 2000; Senik, 2014; Sessions, 1995; Theofilou, 2013). Material abundance and high levels of economic welfare have led some people to take more of a conscious and philosophical approach in their lives (e.g., Buss, 2000; Csikszentmihalyi, 1999; Frey & Stutzer, 2010; Zidanšek, 2007). Ray and Anderson (2001) has revealed an emerging lifestyle subculture that is different from prevailing lifestyles by increased emphasis in the values of harmony with surroundings, authenticity, social conscience, ecological well-being, and human welfare in the US survey research on Americans' values and lifestyles. (e.g., Ashar & Lane-Maher, 2004; Cortese, 2003; Hoffman & Haigh, 2011; Littrell, Jin Ma, & Halepete, 2005). While these values have existed in one for or another, they are seen by some as a new and significant trend in society (Brown & Kasser, 2005; Easterlin & Angelescu, 2009; Veenhoven, 2010; Zidanšek, 2007).

This emerging lifestyle and cultural thinking were called LOHAS (Lifestyle of health and sustainability) by the Natural Marketing Institute (NMI). It was named in an attempt to define the rapid growth of what some saw as a global trend. (N.A, 2016). It has since been used as a designation for a group of people who make behavioral decisions based on the concern beyond their immediate environment (Bilharz & Schmitt, 2011; Cortese, 2003; Wenzel, Kirig, & Rauch, 2007). LOHAS populations make efforts to live healthier and more sustainable lifestyles, and they think about not only personal benefit but also the impact on the community, the environment, and the planet in regards to their purchasing decision (Baker & Bez, 2007; Bierhoff, 2013; Emerich, 2011). According to LOHAS thinkers, it is estimated that LOHAS represents about 25% of the U.S population and describes more than \$200-billion-dollar marketplace (Urh, 2015).

## 1.2 Statement of Problem

Since the NMI speculated that there is a clearly recognizable LOHAS segment, researchers from many countries have investigated the existence of LOHAS in their own cultures

(e.g., Bilharz & Schmitt, 2011; Cowan & Kinley, 2014; Häyrynen, Mattila, Berghäll & Toppinen, 2016; Kim, Lee, Kim & Kim, 2013; Wan, Toppinen, & Chen, 2014). In addition to the US, LOHAS research has been done in South Korea, Germany, Finland, China, Poland, Hungary, and Taiwan. This research has identified some of the attitudes, lifestyles, and activities and interests of LOHAS individuals (Fu, Lee, Pai, & Kuo, 2012; Gelfer, 2010; Montemanni et al., 2013; Wan & Toppinen, 2016).

Unfortunately, the research on the nature and scope of LOHAS has been inconsistent and mixed. In reality, the existence of a distinctive population segment that can be called LOHAS is premature. As one example, the US LOHAS consumers' behavioral patterns were said to tend to purchase eco-friendly products, including organic foods or beverage (Norton, 2012). Furthermore, they are inclined to consider environmental impact before they buy the products (NMI, 2008). In Germany, there was no significant difference in the level of energy consumption between the German LOHAS group and the average household (Bilharz & Schmitt, 2011).

There are many other examples of inconsistent findings that will be discussed later in this dissertation. However, the inconsistent results in the literature may indicate that the LOHAS phenomena are not universal. This point is one of the main focuses of this research. It could very well be that the LOHAS phenomenon is more prevalent in the US than Germany (and any of the other countries where LOHAS has attracted researcher interest), or the US LOHAS consumers are more active in participating in the pro-environmental behavior.

Another research interest in this study has to do with the fact that researchers have not used same LOHAS measuring tools. Researchers appear to develop LOHAS scales that do not adhere to the factors that defined LOHAS by the NMI. Differing scales lead to differing results. Inconsistent findings across cultures or groups may be an artifact of the nonstandard research methods and not reflective of the non-existence of LOHAS. The different psychometrics of the measurement scales might lead to the inconsistency (Auger & Devinney, 2007; Barrett, 1972). If each scale measured the traits of LOHAS in a different way, the meaning of LOHAS in one country would be different from that of another country.

Furthermore, if the US scale has behavioral questions more than the questions regarding attitude, belief, and intention, the scale's ability to predict the actual pro-environmental behavior would be higher than the German scale's (Carrigan & Attalla, 2001). No work could be found

that focuses on the psychometrically sound development of a LOHAS scale. Without that exercise, comparison of research across groups cannot be done with any faith in the findings.

Despite a need for a reliable and valid measure of the construct that is called LOHAS, efforts have been scarce to work on developing a valid and reliable scale. Although researchers devised several measures for individual research in the realm of social, behavioral and life science, each of them is idiosyncratic to the beliefs and needs of the researcher or discipline-specific (Fu, Lee, Pai & Kuo, 2012; Korhonen, 2012; Lehota, Horváth & Rácz, 2012; Wan, Chen & Toppinen, 2015; Yeh, & Chen, 2011). Besides, the scales in the research have not undergone rigorous development procedure nor extensive validation because scale development for a hypothetical construct was considered secondary to the substantive scientific issues (DeVellis, 2017). The result is that the scales differ across the studies in terms of operationalization and methods of measurement. In sum, the currently available scales are insufficient to thoroughly and empirically measure LOHAS as a generalized cultural phenomenon and determine any meaningful differences across studies and populations (Gerbing & Anderson, 1988).

Absence of an accurate and valid measurement scale raises several issues. First, it leads to uncertainty of the legitimacy of research as a scientific work (Schoenfeldt, 1984). Although imperfect measure compared to using no measures might provide some interesting pieces of information about a concept/construct, researchers should always opt for less flawed research (if possible) (DeVellis, 2017). Problems with reliability and validity of the many measures developed to identify LOHAS make it difficult to interpret the results and reach conclusions (Cook, Hepworth, Wall & Warr, 1981; DeVellis, 2017; Schriesheim, Powers, Scandura, Gardiner & Lankau, 1993). Without a valid instrument, widespread production of research that might lead to substantive findings on LOHAS may be useless (Schwab, 1980).

Second, the lack of a reliable and valid measure used across LOHAS research hampers theoretical progress (Korman, 1974; Schwab, 1980). For a theory to be generalized and verified, it is crucial for research findings to be replicated and broadened (Tsang & Kwan, 1999). Differing scales make it almost impossible to have a strong conclusion about LOHAS (Schmidt, Hunter, Pearlman & Hirsch, 1985). Despite the LOHAS theory being introduced about a decade ago (by NMI), it still lacks meaningful replication and development. Although some general findings of sustainable behavior have been identified in research (e.g., LOHAS-minded people's likelihood to purchase environmentally-friendly products), it is not clear or reasonable that it

proves the existence of LOHAS only that people are interested in pro-sustainable behaviors. Little is known about the general tendency for healthy behaviors that would be called LOHAS (Cowan & Kinley, 2014; Duber-Smith & Rubin, 2014). A sound scale that accurately measures the LOHAS lifestyle will generate reliable findings, and replicability of the findings will increase, strengthening the advance of the LOHAS theory (Cabrera-Nguyen, 2010; Schriesheim, Powers, Scandura, Gardiner & Lankau, 1993).

The NMI is an organization that is not born from science but philosophy. Other than proclaiming that LOHAS exists and then selling various not scientific reports about what they found or think the NMI never seemed to be interested in scientific rigor. Thus social scientists came across LOHAS research and thinking by chance. In addition, much of the research appears in international journals of lower impact and rigor than that which would happen if the research had a strong base in U.S. social science. While there is certain face validity to the existence of something that would be called LOHAS, saying it is so (even if a so-called research institute with a formal sounding name that issues reports) does not make it so. Hence this research applies a more structured and sound scientific approach to asking basic questions of the existence of LOHAS and then how it might be measured and validated.

### **1.3 Purpose of the Study**

The purpose of this study is threefold; The first is to develop a valid and reliable LOHAS scale for US research, which will measure and reflect the LOHAS lifestyle. This will be based on developing an operationally defined most widely accepted attributes of LOHAS. Second, once I create a psychometrically reliable and valid scale to measure LOHAS, I will test if the attributes that define the LOHAS lifestyle lead to specific consumer behaviors reflective in the definitions of the constructs. The third is to test cultural universality of the LOHAS lifestyle as measured in a valid and reliable scale. This goal is designed to reveal how cultural attributes are associated with the LOHAS lifestyle, and it will contribute to the development of a general and broad theory.

## **CHAPTER 2. LITERATURE REVIEW**

### **2.1 Conceptualizing LOHAS**

LOHAS is an acronym for the lifestyle of health and sustainability. LOHAS is based on the two words of health and sustainability. Although health and sustainability are the core concepts of LOHAS, the wide variety of perceptions for each word have made it difficult to define the LOHAS construct concretely (Emerich, 2000). The following discussion is based on a descriptive review of the available (limited) literature and thinking on LOHAS.

Most discussions of the LOHAS consumers' market behavior address physical health issues (Pesek, Helton & Nair, 2006). LOHAS aligned people have interests in enhancing personal and family's health and well-being (Park, 2015; Ray & Anderson, 2001). They have been found to purchase often a wide variety of natural and organic products that enhance physical fitness, and its ranges from the foods to the personal care products (Hamzaoui Essoussi & Zahaf, 2008; Hustvedt, Peterson, & Chen, 2008; Mohler, 2006; Kim & Chung, 2011; Kim, Lee, Kim, & Kim, 2013). When buying healthy foods, they tend to trust the information provided by friends or media, and they like to exchange information with their circle (Yeh & Chen, 2011). The behaviors for managing and maintaining optimal physical states such as regular exercise and the intake of the functional foods or dietary supplements are commonly observed among the LOHAS followers (Emerich, 2000; Uzzan, Nechrebeki, & Labuza, 2007).

In terms of health management, LOHAS individuals are open towards the integrative healthcare approaches that treat human being as a balanced entity of mind, body, and spirit (Emerich, 2011). They are interested in seeking out information and services relevant to the alternative and complementary medical care such as Ayurveda and acupuncture (Kettemann, & Marko, 2012; Tindle, Davis, Phillips & Eisenberg, 2005). It is assumed that their seeking of the alternative sources of medicine is not due to the denial of the conventional medicine but due to the different values and beliefs concerning health (Astin, 1998; Larson, 1999).

The second theme in the discussion of the LOHAS marketplace pertains to personal development (Cohen, 2010; Peterson, 2008). Developing self in LOHAS refers to achieving the full potential as a human being. It is fulfilled by getting in touch with a deeper self, recovering one's true nature (cultivating spirituality) (Emerich, 2006; Forman, 2004; Gelfer, 2010; Mróz &

Sadowska, 2015). Understanding that one is connected with all life matters and healing the self in the process of recognizing the unity of mind, body, and spirit help personal development (Nieminen-Sundell, 2011; Pesek, Helton & Nair, 2006). The LOHAS oriented person uses spiritual products or practices including yoga, meditation, Qi-gong, aromatherapy or macrobiotics as a means of personal development (Chandle, 2010; French & Rogers, 2010; Kettemann & Marko, 2012; Zentner, 2016). In LOHAS, spiritual activities lead to a more profound, more self-actualized sophisticated individual (Woodhead, 1993). It is estimated that the spiritual market accounts for eighteen percent of the LOHAS market in the U.S (Westerlund & Rajala, 2006).

The third theme in the literature includes the philosophical and psychological values inherent in the LOHAS population. The values embrace an optimistic future view, the experience of new challenges, desire for peace and a general relationship orientation (Bravacz, 2013; Li, 2013; Chen, 2014; Mróz & Sadowska, 2015). Just how this philosophical/psychological dimension of LOHAS translates into their consumption practices has not been studied or identified, yet research consistently mentions that those are the core values that distinguish the LOHAS consumer segment (Cejie, 2014; Tsai, Lan, Chang, & Chen, 2012). Yeh and Chen (2011) found that LOHAS-oriented people are open-minded (i.e., willing to accept different ideas and opinions) and tend to view positive aspects on things, allowing them to deal with problems in a positive way. Liu and Wu (2014) also argued that they are against pessimism and cynicism and incline to be more optimistic for their future.

The fourth constant factor in the literature is ecological orientation. The environmental consciousness is the manifest characteristic that defines the LOHAS consumers (Axsen, Tyree Hageman, & Lentz, 2012; Kirig, Rauch, Wenzel, 2007; Lorek, 2015; Mondéjar-Jiménez, Cordente-Rodríguez, Meseguer-Santamaría, & Gázquez-Abad, 2011). LOHASians (people who are high in LOHAS lifestyle) are concerned about the environmental impact of a product throughout the entire period of its lifecycle. In other words, they consider the way a product is made, sold, consumed, and discarded and if the process is done without harm or depletion to the environment (Emerich, 2000). The tendency is said to appear in a wide range of the market sectors such as foods, fashion, home goods, green buildings and eco-tourism (Dahlstrom, 2010; Kotler, 2011; Wenzel, Kirig, & Rauch, 2007). According to Korhonen (2012), the LOHAS consumers appreciates environmental value more than the functional, emotional or instrumental

value in product packaging. They paid much attention to the source of the packaging materials or its recyclability, biodegradability. Zentner (2016) argued that the people committed to the LOHAS tend to live as vegetarians or vegans because the food products need less energy and less harmful by-products than meat or fish during the production process. LOHAS consumers prefer the local food products or organic foods because of its mild farming techniques to the environment in addition to its health benefit (Dahlstrom, 2010; Essoussi & Zahaf, 2008; Kristensen & Grunert, 1991). Furthermore, Cowan and Kinley (2014) found that the LOHAS mindset has a positive impact on the purchase intention towards the environmentally friendly apparel, and likewise, Park (2015) revealed that the LOHAS consumption tendency positively affects the purchase intention for the upcycling fashion goods via personal trust.

To purchase the commodities that meet an environmental standard, they tend to focus more carefully on the information concerning the ecological impact of the products. A study on the relationship between the LOHAS level and the information seeking behavior, Yeh and Chen (2011) revealed that the more one is LOHAS-oriented, a careful reading of directions and the labels of contents on the package increased. The license mark of organic products and the environmental endorsements are the information that they mainly seek. Furthermore, due to their higher interests in the environment and the accumulated knowledge by the use of eco-friendly products, they are likely to be asked for advice about the sustainable products, and they are willing to spread and share the information (Huo & Hong, 2013; NMI, 2008).

LOHAS consumers are less price sensitive when purchasing eco-friendly commodities (French & Rogers, 2010). In other words, they are not discouraged by higher prices for sustainable products or services to translate their sustainable belief into their purchasing choices (Kreeb, Motzer, & Schulz, 2008). Wan and Toppinen (2016) found a positive impact of the LOHAS lifestyle and sociodemographic attributes on the willingness to pay a price premium for sustainable furniture for children. Typically, LOHAS consumers are willing to pay up to 20% more for the products made in a sustainable way (NMI, 2008).

Few research studies that have been completed mention water and energy conservation and recycling specifically (Koszewska, 2011; NMI, 2008 72; Urh, 2015), perhaps because these are the simple, repetitive, low-cost daily activities for many people (Black, Stern, & Elworth, 1985; Heberlein & Warriner, 1983; Stern, 1992). For example, reducing wasteful consumption of home energy by turning off the electronics or changing old household appliances to the energy

efficient models, recycling household waste, or reducing the use of the disposable product are the typical actions described by LOHAS researchers (Bamossy & Englis, 2010; NMI, 2008 ). Their motivation for those behaviors relies on the internalized belief that the health of the environment is inherently tied to personal health.

Lastly, most discussions of the LOHAS market behavior include a social responsibility component (Bamossy & Englis, 2010). A strong sense of social justice makes LOHAS consumers choose products from companies that share the values that they endorse (Mróz & Sadowska, 2015). Specific issues of corporate social responsibility (CSR) that they are supposed to be concerned with pertaining to workplace equality, human rights, care for the minority including children and women (Urh, 2015). A previous finding by NMI (2008) indicating that employee care is more important for companies than being conscious of their impact on the environment shows how strongly the LOHAS consumers are concerned with social issues. In line with this , LOHAS-oriented people purchase Fair Trade certified products which indicate, for example, farmers receive higher than average price for their commodities, manufacturers in economically less developed countries realize financial benefit, no child labor is exploited in the production process, or no discrimination is made in wages between men and women (Heim, 2011; McLaughlin, 2004; Pesek, Helton, & Nair, 2006; Tsai, Lan, Chang, & Chen, 2012; VURUŞKAN & FRÖHLICH, 2012). They also boycott businesses which they perceive to be socially irresponsible (NMI, 2008). It is noteworthy that LOHASians reward ethical performance (purchasing ethical products over alternatives) as well as punish unethical actions (refusing to choose unethical products). The two types of social actions are considered to be theoretically distinct in that many who reject the products/services do not necessarily choose ethical products over alternatives (Carrigan & Attalla, 2001; Mattingly & Berman, 2006; Megicks, Memery, & Williams, 2008).

The problem with all this is that most of the summary of LOHAS lacks empirical support. Many of the studies mentioned above conceptually infer the components of LOHAS rather than empirically testing its reliability and validity. This has generated many unverified claims about LOHAS. To substantiate the LOHAS, the LOHAS concept should be measurable, and to this end, a clear and precise definition of LOHAS needs to be preceded. Yet, the definitions of LOHAS are diverse in the literature, and each definition reflects only a fraction of the features of LOHAS. It makes the measurement of LOHAS impossible (Lastrucci, 1963). One overarching



framework that helps to embrace diverse definitions and accurately define what is included in the definition of LOHAS and what is not is imperative for the development of reliable and valid measure (Churchill, 1979).

## **2.2. A priori Dimensions of LOHAS**

The previous review of the market behaviors of the LOHAS consumer provides the first insights into the multidimensional nature of the LOHAS. In detail, the concept of health in LOHAS implies one's integrated effort to actualize personal well-being in physical, spiritual, emotional, and social aspects. The concept of sustainability has been discussed in terms of one's consideration for environmental and social health. In this section, conceptual requirements for underlying dimensions of LOHAS are addressed to set-up a theoretical framework for the measurement criteria of LOHAS.

### **2.2.1 Health**

The healthy life in LOHAS refers to one's behavioral efforts to achieve integrative health in various aspects for optimal living. A theoretical model of holistic health is reviewed in the following to capture the conceptual attributes required to define health in LOHAS operationally. The four sub-dimensions are adopted from the holistic health model (e.g., Hawks, 2004, Witmer, 1992) to describe health in LOHAS, and they are physical, spiritual, emotional, and social health.

#### ***Physical***

Physical health is associated with one's efforts to maintain optimal physical state to perform one's daily tasks (Roscoe, 2009). It includes not only the activities to improve cardiovascular fitness such as staying at normal cholesterol level and maintaining adequate blood pressure but also the regular physical activities for the flexibility or the release of muscle tension (Durlack, 2000; Hettler, 1980). Maintaining a healthy diet, paying attention to balanced nutrition and regular exercise are the essential elements (Croese, Nicholas, Gobble, & Frank, 1992; Hettler, 1980; Renger et al., 2000). Leafgren (1990) further included a dimension of the abstinence from the use of drugs, tobacco, and the excessive use of alcohol. Moreover, it involves preventative

healthcare, which is the utilization of appropriate medical service for the early recognition of problems (Croese et al., 1992).

### ***Spiritual***

Spiritual health pertains to the development of inner resources to maximize human potential (Walker, Sechrist, & Pender, 1995). One's inner nature grows when the two aspects are satisfied; personal fulfillment and recognition of wholeness (Bensley, 1991). Personal fulfillment is generally understood in relation to seeking underlying meaning and purpose of life. Working toward life goals is also seen as an influential positive factor for spiritual health (Bensley, 1991; Dossey, Keegan, Kolkmeir, & Guzzetta, 1989; Travis & Ryan, 2004). On the other hand, the recognition of wholeness is associated with one's belief in the connectedness between body, mind, and spirit (Ellison, 1983). Young (1984) argued that the unity of the three entities is vital for good health and ultimately for human survival. Bellingham, Cohen, Jones, and Spaniol (1989) asserted that recognizing the interconnectedness means to behave aligned with one's inner feelings and values, and they suggested three skills be connected within oneself. They are exploring their feelings, understanding one's values, and achieving congruence.

Given that an individual cannot be separate from the environment and a relational mutuality with something outside of self provides a meaning of life (Spaniol, 2002), being connected with the external environment is integral for one's total health (Burkhardt & Nagai-Jacobson, 2002). Bellingham, Cohen, Jones, & Spaniol (1989) suggested the two ways to foster the connectedness between a person and the outside environment. One is taking time for sharing feelings, values or thoughts with others, and the other is connecting self with more significant meaning in life or developing a profound a life purpose (Bellingham, Cohen, Jones, & Spaniol, 1989).

### ***Emotional***

Emotional health has to do with possession of a positive attitude toward self and life (Leafgren, 1990; Scheer & Lockee, 2003). Adams, Bezner, and Steinhardt (1997) emphasized self-esteem as a major factor for emotional wellness, pointing out that secure self-identity and a positive sense of self-regard are the determinants of self-esteem. Renger et al. (2000) also

emphasized the importance of the self-view in emotional wellness, but they provided an expansive view of the emotional wellness by arguing that it pertains to the level of anxiety, depression, well-being, self-control, and optimism. They also cited an experience of satisfaction, interest, and enjoyment as another component for emotional health. Similar to their arguments that the optimistic future view and positive outlook have a positive impact on the emotional well-being, Hettler (1980) mentioned a positive life approach as one of the essential components of the optimal emotional state. The positive approach to life was conceptualized as viewing life hardships such as conflicts, risks, and challenges as the opportunities for self-development.

### ***Social***

Social health is defined as an ability to perceive one's interdependence with others and maintain a harmonious relationship with people (Greenberg, 1985; Leafgren, 1990) Social health is determined by the dynamics of the several elements such as communication, network, interaction and affection (Becker, Moore, Whetstone, Glascoff, Chaney, Felts, & Anderson, 2009; Durlak, 2000). (Travis & Ryan, 2004; Walker, Sechrist, & Pender, 1987). Renger et al. (2000) viewed the interaction as a barometer of a harmonious life and argued that the extent to which one is comfortable with expressing feelings, needs, and opinions affects the quality of interaction. The scope of social network and giving and receiving help with others are another aspects of social health (Croese et al., 1992). Participating in social activities and managing life with a certain degree of interdependence with others positively influence social health (Huber et al., 2011).

### **2.2.2 Sustainability**

The threat of the depletion of natural resources and social inequality are some major themes in the critique of consumer societies (e.g., Sanne, 2002). The crisis of the environmental degradation caused from excessive consumption and the continued poverty of the majority of the world population fueled the debates over 'sustainable growth of the planet' (Sneddon, 2000; Sustainability and UNEP, 2000).

The general definition of 'sustainability' includes "the capacity of a system to maintain output at a level approximately equal to or greater than its historical average, with the

approximation determined by the historical level of variability (Lynam and Herdt, 1989). The viewpoints on the meaning of sustainability, however, vary depending upon who is using it in what context (Bell & Morse, 2012). When ‘sustainability’ is put in the sustainable development context, ‘sustainable’ implies ‘ensuring and improving the quality of human life in harmony with the environment’. This idea is well presented in principle 1 of the Rio declaration (UNCED, 1992): “Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature”.

Considering that human is part of earth system who is involved in complex interactions with its other components, sustainability depends on the individual behaviors of over 7.5 billion human beings, the decisions and choices they make, the lifestyles they follow, and their consumption patterns (Dahl & Dowdeswell, 1996; Dahl, 2012). Indeed, many advocates of sustainable development recognize the need for changes in human values, attitudes, and behaviors (Leiserowitz, Kates, & Parris, 2006). They also agree that the shift toward sustainable consumption is one of the most effective means of promoting sustainability (Khalili, Melaragno, & Haddadian, 2011). In 2002 at the World Summit on Sustainable Development (WSSD), sustainable consumption was declared as one of three overriding objectives for global sustainable development (Barber, 2003).

Given that a concept of sustainability is derived from moral and ethical foundations and suggests a prescription of how to translate the moral and ethical values into concrete plans of action, it possesses normative characteristics (Renn, Jäger, Deuschle, & Weimer-Jehle, 2009). In other words, it provides the principles of how human beings should behave toward nature and how they take responsible actions for one another and future generation (Baumgärtner, & Quaas, 2010). Two aspects of sustainability appear to be addressed importantly in the normative discussion: 1) to guarantee the desirable state of the environmental system (i.e., environmental sustainability) 2) to ensure inter- and intergenerational justice (i.e., social sustainability) (Wilbanks, 1994; (Renn, Jäger, Deuschle, & Weimer-Jehle, 2009).

To achieve environmental sustainability, one needs to clarify what aspects of the environment should be sustained, and then the goals need to be translated into precise practical actions. Two fundamental functions of the environment are the source and sink services; the source service provides raw materials such as air, water, energy, food, and the sink service pertains to receiving waste and pollutants within the environment’s capacity (Goodland, 1995).

Environmental sustainability implies maintaining sustainable levels of both source and sink capacity.

In regards to the source function, major environmental problems of acid rain, stratospheric ozone depletion, and greenhouse effect are attributed to energy-related activities (Dincer, 2000). Electric power generation, gas-fired heating, industrial energy use, and coal use explain 70-80% of SO<sub>2</sub> emission, which is major air pollutants contributing to acid precipitation (Dincer, 2001). Stratospheric ozone depletion is caused by chemical materials emissions such as Chlorofluorocarbons (CFCs), halons, NO<sub>x</sub>, and particularly CFCs is used in air conditioning, cooling machine as refrigerant, manufacturing of aerosol sprays, and blowing agent for packing materials (Dincer 2000; Dincer & Rosen, 1998). The greenhouse effect occurs mostly by CO<sub>2</sub> and partially by other gases (e.g., CH<sub>4</sub>, CFCs, halons), and those gases are caused from fossil fuel consumption, methane emissions from human activities, and deforestation (Dincer, 2000). Possible solutions to these problems include the use of renewable energy sources, energy conservation, recycling, and promoting public transport (Dincer, 2000).

Moreover, sustainable agriculture contributes to preserving the natural environment. For example, organic farming techniques that choose not to use pesticides, herbicides, pesticides, and GMO preserve flora and fauna, thereby enhancing biodiversity in agricultural ecosystems (Gomiero, Paoletti, & Pimentel, 2008; Kilcher, 2007). It also contributes to soil fertility by leaving soil covered with organic matter, and it helps cultivate healthy and quality crops (Gliessman, 2007; Lotter, 2003; Pimentel, Hepperly, Hanson, Douds, & Seidel, 2005). In terms of energy conservation, it has shown that organic farming systems perform better than traditional ones (i.e., the ratio of energy input/output) (Gomiero, Paoletti, & Pimentel, 2008). For instance, lower fossil energy consumption was found for organic crop production including potatoes, citrus, apple due to lower use of synthetic fertilizers that require high energy consumption for their production and transport (e.g., Pimentel, Berardi, & Fast, 1983; Pimentel et al., 2005). Furthermore, given that agriculture accounts for 50-60% of GSGs released from human activities, organic agriculture practices play partial role to reduce emission of CO<sub>2</sub> and other GHGs (e.g., carbon) by limiting the use of agrochemicals used in field work and machinery use (Gomiero, Paoletti, & Pimentel, 2008; IPCC, 2007).

Social sustainability is concerned with creating sustainable communities that not only meet the needs of current members in societies but also support the right of future generations to

live in healthy and livable communities (Littig & Griessler, 2005; McKenzie, 2004; Online Business Dictionary, n.d). It occurs when societies shape and regulate their processes, systems, and structures in the direction of ensuring good quality of life for all social members (Littig & Griessler, 2005; Barron & Gauntlet, 2002). When social sustainability is put in the context of the private sector (i.e., business), its manifestation is typified by the corporation's efforts to consider its economic and social impact on people (e.g., stakeholders, consumers, employees, suppliers, community members) (Boyer, Peterson, Arora, & Caldwell, 2016; Smith, 2003). This is related to a responsible approach to business practices that go beyond the traditional "bottom line" of profitability and recognize its connectedness to social members (Garriga & Melé, 2004; Mathias, 2005).

Gradually, consumers are informed and engaged and thus they take into account the public impact of their private consumptions. They want to purchase products and services that have a positive influence on society or to advocate business that takes socially responsible actions for positive social changes (ADEC INNOVATIONS, n.d.; Roberts, 1993; Webster Jr, 1975). The values that consumers expect to be preserved or improved through corporate social responsibility (CSR) along the social aspect of sustainability involve participation, equal opportunities, justice, diversity, quality of life, social cohesion (ADEC INNOVATIONS, n.d.; Littig & Griessler, 2005). Barron and Gauntlet (2002) summarize the five key values of the social dimension of sustainability:

- Equity — the community provides equitable opportunities and outcomes for all its members, particularly the poorest and most vulnerable members. While equity is listed as a separate principle, it is such a fundamental component that it is really an artificial separation. Equity in fact operates like a filter through which all other principles are viewed. For example, while the quality of life includes people's sense of connection with nature, this needs to be understood in terms of the extent to which all people have access to a positive environment (Barron and Gauntlet, 2002, p.4).
- Diversity — the community promotes and encourages diversity (Barron and Gauntlet, 2002, p.4).

- Quality of life — the community ensures that basic needs are met and fosters a good quality of life for all members at the individual, group, and community level (Barron and Gauntlet, 2002, p.4).
- Interconnectedness — the community provides processes, systems, and structures that promote connectedness within and outside the community at the formal, informal, and institutional level (Barron and Gauntlet, 2002, p.4).
- Democracy and governance — the community provides democratic processes and open and accountable governance structures (Barron and Gauntlet, 2002, p.4).

The relationship between CSR and consumer's likelihood to purchase product from a company was found to exist when the products and services offered by that company meet social and ethical requirements, indicating that the more consumers trust a company as being socially responsible, they will be likely to buy the products that the company is offering (e.g., Castaldo et al., 2009).

To summarize, review of the literature suggests that the measurement criteria of the LOHAS lifestyle encompass one's effort to achieve physical, emotional, spiritual, social, and intellectual health, and the effort to improve the well-being of environment and society.

## **2.3 Measuring LOHAS**

This section is dedicated to review existing scales used in LOHAS research in terms of the conceptual definitions, and most importantly reliability and validity for if a scale is not reliable and not valid, it cannot be trusted as a basis of research.

Most of the LOHAS research thus far has been done for the market research on the assumption that the LOHAS is a specific group of consumers, not an aspect of all consumers. In the previous research, LOHAS scales have been utilized as a tool not only to define the distinctive characteristics of the LOHAS lifestyle but also to investigate whether the attributes are reflected in specific behaviors. Unfortunately, the studies provide only limited insights because the currently available scales fail to measure the constituent values in LOHAS comprehensively.

In the majority of the research, the LOHAS is understood as only part of the total meaning of environmental consciousness. For example, Cowan and Kinley (2014) measured the

LOHAS lifestyle using the questions concerning the environmental consciousness, environmental knowledge and pro-environmental attitude, and Häyrynen, Mattila, Berghäll and Toppinen (2016) included a set of items measuring awareness of the environmental problems, preference for the pro-environmental products and perceived self-efficacy toward an environmental behavior. Kim, Lee, Kim, & Kim (2013) focused on the green purchase, natural resource conservation, and environmentalism. Park (2015) utilized several questions about the preference for green products and the degree of activeness toward environmental protection behavior. The problem is that with no accepted set of standard questions to measure this construct, a comparison of findings across studies is impossible.

Despite the attempts made in several studies to use the scales that measure LOHAS comprehensively, the scales still tend to be limited to one particular aspect of LOHAS. For instance, in the study on the LOHAS index development for the older people, Fu, Lee, Pai, & Kuo (2012) measured LOHAS from the health perspective. They defined LOHAS as an optimal mental state where satisfaction is achieved in a wide range of life domains. However, they did not include sustainability issues. Koszewska, (2011) included questions measuring social responsibility, but the questions limited the ethics in LOHAS to the choice of products from the companies showing socially responsible actions, with little to measure other domains. There is nothing wrong with studies looking at limited/selective aspects of LOHAS, but there is a problem when the results claim to be reflective of all of LOHAS.

A well-defined conceptualization of lifestyle should be based on the variety of elements that the various researchers have claimed to be part of LOHAS: ranging from hidden aspects of individual's life including values, personality traits, attitudes to more clearly observable factors like activities or collection of products purchased and consumed (Hustad & Pessemier, 2011; Kahle & Valette-Florence, 2012; Wind & Green, 2011). Current scales describe the LOHAS lifestyle relying on only one component (Cowan & Kinley, 2014; Koszewska, 2011; Wan, Chen, & Toppinen, 2015; Wan & Toppinen, 2016; Wan, Toppinen, & Chen, 2014) or rarely more (Häyrynen, Mattila, Berghäll, & Toppinen, 2016; Kim, Lee, Kim, & Kim, 2013). In contrast, Yeh and Chen's (2011) scale is comprised of 30 items containing the questions assessing cognitive, emotional, and behavioral dimensions as tapping the various domains in the LOHAS. Lehotá, Horváth, and Rácz, (2012) also utilized both attitudinal and behavioral questions in the research on the typology of the Hungarian consumers. However, in spite of the elaborateness in



regard to the questions' domains and functionality, it cannot be said that the scales are reliable and valid because the scale did not undergo rigorous reliability and validity tests. Findings across studies cannot be compared or standardized. The reason why a doctor uses a blood test to measure the health of a person is that there are benchmark standards in each of the measures in a blood test. If each physician were able to make up their measures, the chaos in medicine would be quite clear. Table 1 shows a summary of the most widely used scales to measure LOHAS.

Table 1. LOHAS scales review

<b>Research</b>	<b>Operational Definition of LOHAS</b>	<b>Conceptual Framework for Lifestyle</b>	<b>Source of items</b>	<b>Reliability/ validity</b>
Cowan & Kinley (2014)	Concerns and knowledge about the environment	Attitude	Adopted from past research related to environmentalism	Reliability ( $\alpha > .70$ )
Wan & Toppinen (2016)	Buying eco-friendly products	Perception	Adopted from past research related to pro-environmental behavior	Construct validity
Häyrynen, Mattila, Berghäll, & Toppinen (2016)	Pro-environmental engagement	Attitude, perception, awareness	Adopted from past research related to sustainability and LOHAS	Reliability ( $\alpha > .75$ )/ validity
Wan, Chen, & Toppinen (2015)	Buying eco-friendly products	Perception	Adopted from past research and the LOHAS website (www.lohas.com)	N/A
Fu, Lee, Pai, & Kuo (2012)	Optimal psychological state	Attitude, perception	Unspecified	Reliability ( $\alpha > .85$ )
Yeh & Chen (2011)	Physical, social and mental health and eco-friendly activities	Behavior, cognition, emotion	<a href="http://www.isurvey.com/tw">www.isurvey.com/tw</a>	N/A
Koszewska (2011)	Prosumer ethics	Behavior	Unspecified	Reliability ( $\alpha > .50$ )

Table 1 continued

<b>Research</b>	<b>Operational Definition of LOHAS</b>	<b>Conceptual Framework for Lifestyle</b>	<b>Source of items</b>	<b>Reliability/ validity</b>
Szakály, Popp, Kontor, Kovács, Pető, & Jasák (2017)	Health/environmental consciousness and ethical/authentic value-oriented	Attitude, perception, behavior	Adopted from past research related to LOHAS	Reliability ( $\alpha > .70$ )
Lehota, Horváth, & Rácz (2012)	Health and environmental consciousness, ethical behavior, authentic value	Behavior, attitude, value, consciousness	Qualitative research	N/A
Kim, Lee, Kim, & Kim (2013)	Environmentalism, green consumerism, conserving resources	Opinion, behavior	Qualitative research	Reliability ( $\alpha > .75$ )/ validity
Park (2015)	Environmental protection	Consumption, behavior, perception, preference	Adopted from past research related to health and well-being	Reliability ( $\alpha > .85$ )/ validity

To summarize, the existing scales cannot claim to measure the features of LOHAS thoroughly since they did not go through with thorough scale development procedure. The lack of reliability and validity of the scales further undermines the claims of LOHAS research. To give a credential to the LOHAS research, one standard, reliable, and valid measure is imperative. Thus, this study is designed to develop standard questions for measuring the components of LOHAS in the hopes that a standard measuring tool can and will be used in future research so that the field will make some sense and be imbued with more rigor and create more research and development opportunities.

## CHAPTER 3. METHODOLOGY

### 3.1 Procedures

The LOHAS scale is developed and validated based on the scale development procedure suggested by Churchill (1979). This procedure consists of five steps, including construct domain specification, item generation, purification of the items, reliability, and validity tests. The steps and hypotheses for each step are summarized in Table 2.

Table 2. Suggested Procedure for Developing Better Measures

Procedure	Recommended Techniques or Coefficients	Hypothesis Testing
<i>Step 1</i> Specify the domain of the construct	Literature research	
<i>Step 2</i> Generate a sample of items	Qualitative literature review Experience survey Focus groups	
<i>Step 3</i> Purify measure (Initial data collection)	Initial coefficient alpha Factor analysis	Multi-dimensionality of the LOHAS scale/factor congruence across cultures
<i>Step 4</i> Assess reliability (Additional data collection)	Coefficient alpha Test/Retest Split-half validity	Reliability of the scale /measurement invariance across cultures
<i>Step 5</i> Assess validity	Multitrait-multimethod matrix	Convergent validity, discriminant validity, nomological validity, predictive validity

Source: Churchill (1979)

### 3.2 Subject selection for scale development

LOHAS has attracted a loyal following in South Korea. Research has been conducted to investigate managerial implications for the assessment and the expansion of the LOHAS marketplace. Can studies done in SK be used to measure LOHAS in the U.S. Can the findings from studies done in SK be generalized to findings we should expect in the U.S. In the SK

studies disparate LOHAS measuring tools were used, and there was no agreement on the features of the LOHAS lifestyle.

To start the process 28 LOHAS questions from the South Korean LOHAS studies that seemed to adequately reflect a definition and traits of the LOHAS lifestyle pertinent to the U.S. were selected. In addition, I selected questions from U.S. scales that have been done to measure aspects of the five attributes discussed earlier. These questions were selected to reflect the underlying attributes of LOHAS. For developing a global LOHAS scale, the U.S. scale items were combined with the 28 Korean items making a total of 80 questions to begin the psychometric development process (Steps 1 and 2 Table 2). I used this new combined scale to begin the research into LOHAS reliability and validity tests. Table 3 describes initial LOHAS scale items.

Table 3. LOHAS scale items

Domains	Items	Source
Physical health	I exercise regularly.	Choi, Yoon, & Moon (2011)
	My daily meals are nutritionally balanced.	Kraft & Goodell (1993)
	I purchase and eat foods considering my health.	Choi, Yoon, & Moon (2011)
	I limit foods like sugar, coffee, fats, etc.	Harris & Guten (1979)
	I choose a diet low in fat, saturated fat, or cholesterol.	Walker, Sechrist & Pender (1995)
	I moderate my red meat consumption.	Moorman & Matulich (1993)
	I avoid foods with high additives.	Dutta-Bergman (2004 a)
	I worry that there are harmful chemicals in my food.	Kraft & Goodell (1993)
	I usually read the ingredients on food labels.	Kraft & Goodell (1993)
	I restrain myself from using harmful products such as drug, cigarette, or alcohol.	Choi, Yoon, & Moon (2011)
	I maintain a healthy body weight.	Dutta-Bergman (2004 b)
	I take vitamins and mineral supplements regularly.	Dutta-Bergman (2004 b)
	I actively participate in physical examination personally or in the workplace.	Choi, Yoon, & Moon (2011)
	I see a doctor for a regular checkup.	Harris & Guten (1979)
	Eating right, exercising, and taking preventive measures will keep me healthy for life.	Dutta-Bergman, (2004 b)
	My health depends on how well I take care of myself.	Dutta-Bergman, (2004 b)

Table 3 continued

Domains	Items	Source
Physical Health, cont.’	I take vitamins and mineral supplements regularly.	Dutta-Bergman (2004 b)
	I actively participate in physical examination personally or in the workplace.	Choi, Yoon, & Moon (2011)
	I see a doctor for a regular checkup.	Harris & Guten (1979)
	Eating right, exercising, and taking preventive measures will keep me healthy for life.	Dutta-Bergman, (2004 b)
	My health depends on how well I take care of myself.	Dutta-Bergman, (2004 b)
Mental health	I take some time for relaxation each day.	Walker, Sechrist & Pender (1995)
	I practice relaxation or meditation for 14-20 minutes daily.	Walker, Sechrist & Pender (1995)
	I try to control stress.	Choi, Yoon, & Moon (2011)
	I reduce stress and anxiety.	Moorman & Matulich (1993)
	I use specific methods to control my stress.	Walker, Sechrist & Pender (1995)
	I spend time each day trying to reduce accumulated stress.	Kraft & Goodell (1993)
	I practice yoga three times a week.	Lebensohn, Dodds, Benn, Brooks, & Birch (2013)
Emotional health	I am able to speak openly about my feelings when angry or worried.	Edlin & Golanty (2012)
	I try to control emotion.	Choi, Yoon, & Moon (2011)
	I do something just for fun at least once a week.	Edlin & Golanty (2012)
	I try to take positive outlook on things.	Shanafelt et al. (2005)
	I think positively of life.	Choi, Yoon, & Moon (2011)
	I try to cope with positively on failure and frustration.	Choi, Yoon, & Moon (2011)
	I participate in everything with zeal.	Choi, Yoon, & Moon (2011)
	I get satisfaction from simple, everyday pleasures.	Edlin & Golanty (2012)
Social health	I am close with family, friends, colleagues, and neighbors.	Choi, Yoon, & Moon (2011)
	I have a good and meaningful relationship with others.	Choi, Yoon, & Moon (2011)
	I attend a club or social activities on a regular basis.	Edlin & Golanty (2012)
	I volunteer for the poor or local society.	Choi, Yoon, & Moon (2011)
	I try to become a necessary being in society.	Choi, Yoon, & Moon (2011)

Table 3 continued

Domains	Items	Source
Intellectual health	I pursue self-development continuously.	Choi, Yoon, & Moon (2011)
	I enjoy new experiences and challenges.	Choi, Yoon, & Moon (2011)
	I read about different topics from a variety of newspapers, magazines and books.	Scheer & Lockee (2003)
	I have generally found intellectual challenges to be vital to my overall well-being.	Adams, Bezner & Steinhardt (1997)
	I try to share positively my knowledge or experiences with others.	Choi, Yoon, & Moon (2011)
Spiritual health	I feel I am growing and changing in positive ways.	Walker, Sechrist & Pender (1995)
	I know the meaning of life, and I have my own goal for it.	Choi, Yoon, & Moon (2011)
	I feel connected with some force greater than myself.	Walker, Sechrist & Pender (1995)
	I nurture the spiritual aspects of myself	
	I spend a portion of the everyday in prayer, meditation, or personal reflection.	Scheer & Lockee (2003)
	I feel a sense of connectedness with other human beings.	Scheer & Lockee (2003)
	I share feelings of joy, love, and peace with others.	Choi, Yoon, & Moon (2011)
Environmental sustainability	I protect the environment.	Lampe (2008)
	I prefer sustainable agriculture practices.	Lampe (2008)
	I buy organically grown produce.	Tanner & Wölfling (2003)
	I raise organic fruit and vegetables.	Lorenzen (2012)
	I conserve energy by turning off the lights.	NMI (2008)
	I use public transportation rather than the car.	Choi, Yoon, & Moon (2011)
	I use unleaded gasoline in my automobile.	Choi, Yoon, & Moon (2011)
	I am interested in renewable energy sources.	Lampe (2008)
	I recycle paper, glass or plastic container.	Barr & Gilg (2006)
	I prefer products made of recycled materials.	Lampe (2008)
	My purchase decisions are based on its effect on the world.	Lampe (2008)
	I choose environmentally friendly products.	Lampe (2008)
	I prefer products manufactured in sustainable ways.	Lampe (2008)
	I choose sustainable source products over conventional ones.	Lampe (2008)
	Before I purchase, I consider if the products would be easily dissembled for repair or reuse.	Kurk & McNamara (2006)

Table 3 continued

<b>Domains</b>	<b>Items</b>	<b>Source</b>
Environmental Sustainability, cont.	I compost kitchen or garden waste.	NMI (2008)
	I turn tap off while brushing teeth, washing hands or washing dishes.	Barr & Gilg (2006)
	I teach the benefits of environmentally friendly products to family or friends.	Lampe (2008)
	I am willing to pay an additional 20% for sustainably manufactured products.	Lampe (2008)
	I believe that my small practices can make a difference in addressing environmental protection.	Choi, Yoon, & Moon (2011)
	I would be willing to reduce my consumption to help protect the environment.	Choi, Yoon, & Moon (2011)
Social sustainability	I am socially conscious.	Lampe (2008)
	I consider the local society and its members in daily life.	Choi, Yoon, & Moon (2011)
	I consider the entire world and population in daily life.	Choi, Yoon, & Moon (2011)
	I buy products from companies with values like my own.	Lampe (2008)
	When purchasing products, I depend on whether a company perceives its own social responsibility.	Choi, Yoon, & Moon (2011)
	I would pay a premium to buy the products of a company that shows ethically and socially responsible practices.	Choi, Yoon, & Moon (2011)
	I believe that my small efforts can contribute to increasing well-being of our society.	Choi, Yoon, & Moon (2011)

The items were categorized on their face value or as identified by the prior researchers. The validity of the categories will be refined and reflected as the psychometric analysis continues.

### 3.3 Samples and data collection

#### 3.3.1 College students sample

In theoretically-oriented studies, college student sample has been widely used. The homogeneous nature of the college student sample is useful for theory testing and qualification (Greenberg, 1987; Lynch, 1982). It is also suitable for the cross-cultural studies because the

homogeneity of the samples makes it is easy to match sample characteristics between cultures, and this provides more accurate theoretical prediction (Hofstede, Hofstede, & Minkov, 2010; Lysonski, Durvasula, & Zotos, 1996).

The sample in this study consisted of two groups; the US undergraduate and graduate students at Purdue University, and South Korean undergraduate and graduate students at Purdue University. For the US students sample, 6,648 questionnaires were randomly distributed via email by the office of the registrar, and 371 students answered the questionnaire using Qualtrics Web-based survey software. After invalid responses of 26 unopened and 32 incompletes were excluded, a total of 313 completed surveys were obtained. It yielded a usable response rate of 5.6%. For the S.Korean student sample, 698 questionnaires were randomly emailed, and a total of 242 surveys was returned. Twenty-six were returned unopened, and five were incomplete. As a result, 211 usable questionnaires were obtained. It represented a response rate of 30.2%.

This procedure of recruiting SK students' sample in the U.S. instead of recruiting SK students in SK has been used in prior studies to look at differences between cultures when doing survey research in the second country is not practical (e.g., Jung & Sung, 2008).

### **3.3.2 General population sample**

Critics of social science research have always claimed that in measurement development study the use of student sample undermines the external validity and generalizability of the findings because of a lack of representativeness and unique characteristics of the student population (e.g., Burnett & Dune, 1986; Wells, 1993). Considering that the features of the subject population interact with a theoretical phenomenon, and the examination of the interaction effect facilitates the theory development (Gordon, Slade, & Schmitt, 1986; Oakes, 1972), it was decided to collect general US population sample in this study.

For the general US population, subjects aged between 18 and 65 were recruited online from Amazon Mechanical Turk. MTurk is an online marketplace where intellectual labor transactions are carried out. In this platform, a researcher (an employer) can publicly recruit participants (workers) by registering a job (an experiment or a survey) called Human Intelligence Task (HIT) with monetary compensation for each response (Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). Three hundred and ten surveys were returned with monetary compensation of



\$.30 per participant and three hundred surveys were used after excluding ten unreliable responses<sup>1</sup>.

Although there have been challenges and concerns of MTurk as a non-probability based internet sampling method, a body of research has demonstrated that Mturk panels may be able to represent the U.S population as a whole, and the data quality is comparable to the samples recruited by other methods (DiSogra, Cobb, Chan, & Dennis, 2011; Paolacci, Chandler, & Ipeirotis, 2010; Yeager et al., 2011). In particular, subject pool diversity enables MTurk panels to be more representative of the U.S population than other types of internet samples and typical American college samples (Buhrmester, Kwang, & Gosling, 2011; Ross, Irani, Silberman, Zaldivar, & Tomlinson, 2010). Furthermore, the diverse cultural backgrounds of the MTurk workers facilitate cross-cultural comparisons of the research interest (Paolacci, Chandler, & Ipeirotis, 2010).

### **3.3.3 Combined samples and data analysis**

To develop one global standard LOHAS scale, each group of samples is combined, and a total of 855 surveys were used for the data analysis. This procedure of analyzing the pooled sample has been used in the prior research to develop a cross-culturally standard scale (e.g., Yoo, Donthu, & Lenartowicz, 2011). Yoo et al. (2001) performed factor analysis on each of the individual samples (i.e., 3 different groups) and pooled sample. They found the same underlying factor structure in both individual and pooled sample.

The combined surveys were randomly split into three sets: the first set of 200 surveys were used for the item purification, the second set of 319 surveys were used for exploratory factor analysis, and the final set of 336 surveys were used for confirmatory factor analysis and reliability and validity tests.

### **3.4 Scale instrumentation**

The scale items were generated from the literature published in the US and South Korean journals. Therefore, some of the items were in English, and others were in Korean. The individual item needed to be translated into the opposite language. Four bilingualists were

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<sup>1</sup> Surveys opened but not completed

employed for the translation and back-translation. For the items in English, a bilingual expert fluent in both English and Korean translated it into Korean. The verbal equivalence was examined through back-translation with another bilingualist (Craig & Douglas, 2005). This procedure was repeated until the meaning of English items was deemed equivalent to those in Korean. The same process was conducted to the items in Korean with the other two bilingualists.

## CHAPTER 4. RESULTS

### 4.1 Construct domain specification

The academic literature and popular sources, including magazines, market reports were consulted to specify the domains of the LOHAS. In this study, LOHAS was operationally defined as a selective lifestyle which realizes the integrative health at a personal level, tries in daily life to protect the environment for the consideration of the future generation, and pursues the common prosperity of the existing human beings.

The environment-friendly lifestyle in LOHAS differs from the lifestyles of environmental activists or civil groups who socially express a personal belief, having an ethical responsibility and duty. In comparison with the environmentalists who perform the ought-to-do responsibility, LOHASians are the life practitioners who perform daily pro-environmental practices and consume green products. Figure 1 presents the LOHAS lifestyle in the continuum.

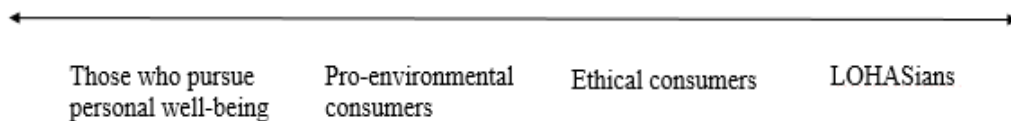


Figure 1. LOHAS in the continuum

Eight domains of the LOHAS include: (1) physical health (2) mental health (3) emotional health (4) spiritual health (5) social health (6) intellectual health (7) environmental sustainability (8) social sustainability

### 4.2 Item generation and content validity

The initial questionnaire consisted of 80 items; 51 items selected from the US literature research and 29 items developed in South Korea. To assess the significance of the initial S. Korean LOHAS items, a Delphi technique was employed. The Delphi technique is a method that transforms opinion to a group consensus. It helps effective decision making in social science (Hasson, Keeney & McKenna, 2000). Eleven experts in S. Korea who had knowledge about

LOHAS were selected as a panel, and three rounds were taken to reach a consensus about the representativeness of the LOHAS items. Both qualitative (i.e., open-ended questions) and quantitative (i.e., survey questions using a five-point bipolar Likert scale ranging from “extremely important (5)” to extremely unimportant (1)) procedures were used to assess the significance of items and modify and select the final items.

### **4.3 Psychometric analysis for the LOHAS scales in three different cultural groups**

#### **4.3.1 Purification and reliability**

The main purpose of purifying multi-item scale is to reduce the number of items to get an internally consistent scale (Bloch, 1981). The internal consistency is concerned with whether the scale is representative to measure a certain domain. If inter-item consistency is high, it means that the items in the scale are drawn from a single construct (Churchill, 1979; Nunnally & Bernstein, 1994).

#### ***Data***

Hundred-five SK students’ sample, hundred fifty-six US students sample, and hundred fifty US general population sample were used respectively to purify the initial LOHAS items for each group.

#### ***Analysis***

Cronbach (1951)’s alphas were used to assess the internal consistency of the set of items for each construct (Lankford & Howard, 1994; Oppenheim, 1992). Then, corrected-item-to –the total correlation was calculated to investigate the items that do not correlate well with the rest of the items within a domain. To make each set of items reliable, the items with a corrected-item-to-total correlation less than .40, high cross-loading, and high variance/low mean were eliminated at a time (Ewing & Napoli, 2005; Wong, Rindfleisch, & Burroughs, 2003).

Through the alternation of dropping an item with low correlation to the composite variable and examining the coefficient alpha, items that contribute to .60 or higher Cronbach’s alpha coefficient were retained for each domain (Nunnally & Bernstein, 1994). To achieve the internal consistency, alpha of greater than .75 is recommended in general (Peter & Churchill, 1986), but

acceptable alpha values vary from .50 on shorter form of tests (Kehoe, 1995) to .60 (Mitchell, 1997; Nowak, 1996) and .70 on longer form (Cortina, 1993; Nunnally, 1979). This procedure was performed separately in three samples.

## ***Results***

The number of remaining items for each LOHAS dimension in S. Korean sample are twelve for physical health, six for mental health, nine for emotional health, five for social health, five for intellectual health, eight for spiritual health, eighteen for environmental sustainability, and seven for social sustainability. For the US students sample, eight for physical health, six for mental health, nine for emotional health, two for social health, two for intellectual health, five for spiritual health, sixteen for environmental sustainability, and seven for social sustainability. In case of US general population, eleven items for physical health, six for mental health, eight for emotional health, five for social health, five for intellectual health, seven for spiritual health, seventeen for environmental sustainability, and seven for social sustainability. It was found that scales are different for populations, indicating that the LOHAS phenomena occurs in a different way across the populations.

Cronbach's  $\alpha$  for each LOHAS dimension in each sample is presented below in the table 4: physical health with .88, .82, .85 for S Korean students, US students, and general US population, respectively; mental health with .88, .85, .85; emotional health with .89, .84, .92; social health with .78, .75, .79; intellectual health with .77, .66, .80; spiritual health with .85, .82, .88; environmental sustainability with .91, .94, .94; social sustainability with .82, .83, .91. Table 4 shows a summary of the reliability of the LOHAS scales in three different groups.

Table 4. Scale reliabilities and associated statistics

	S. Korean students data					US students data					US general population data				
	Development sample ( <i>n</i> = 105)					Development sample ( <i>n</i> = 156)					Development sample ( <i>n</i> = 150)				
	No. of items	$\alpha$	Mean <sup>a</sup>	S.D.	Item-total correlation	No. of items	$\alpha$	Mean	S.D.	Item-total correlation	No. of items	$\alpha$	Mean	S.D.	Item-total correlation
Physical	12	.88	3.5	1.2	.65	8	.82	3.4	1.2	.67	11	.85	3.6	1.1	.64
Mental	6	.88	3.4	1.2	.80	6	.85	3.3	1.1	.75	6	.85	3.5	1.1	.76
Emotional	9	.89	4.0	0.9	.74	9	.84	3.9	0.9	.66	8	.92	3.9	1.0	.81
Social	5	.78	3.5	1.0	.74	2	.75	4.3	0.8	.90	5	.79	3.1	1.3	.74
Intellectual	5	.77	3.8	0.9	.72	2	.66	4.1	0.9	.87	5	.80	4.1	0.9	.74
Spiritual	8	.85	3.5	1.1	.70	5	.82	3.5	1.2	.75	7	.88	3.5	1.3	.76
Environmental sustainability	18	.91	3.1	1.1	.64	16	.93	3.4	1.0	.71	17	.94	3.6	1.1	.68
Social sustainability	7	.82	3.3	1.0	.70	7	.83	3.6	1.0	.71	7	.91	3.5	1.1	.81

<sup>a</sup> Mean scale score=sum of items/number of items.

#### **4.3.2 Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)**

Exploratory factor analysis (EFA) was performed using SPSS version 24.0 to evaluate the remaining items using principal component analysis (PCA) with varimax rotation. The EFA is useful to identify the underlying factor structure of a construct at the preliminary stage of the scale construction (Gerbing & Anderson, 1988; Yi & Gong, 2013). PCA, which is a commonly used factor extraction method, was used in this research. This is recommended when detection of the several components is needed that explains most of the variance in observed variables (Sreejesh, Mohapatra, & Anusree, 2014; Williams, Onsman, & Brown, 2012). The PCA is particularly useful when simply reducing data from a number of variables to fewer dimensions because it does not assume a priori relationship between latent variables and measurement items (Gorsuch, 1983; Henson & Roberts, 2006; Jolliffe, 2011; Sreejesh, Mohapatra, & Anusree, 2014). The PCA was followed by orthogonal varimax rotation to facilitate the interpretation of the initial factor solution (Henson & Roberts, 2006; Williams, Onsman, & Brown, 2012). It has been argued that the orthogonal rotation produces more easily interpretable and parsimonious results, which increase replicability of the factor structure (Hetzel, 1996; Osborne, 2014).

Holding the EFA settings above, individual item analysis followed to determine the number of factors that summarizes underlying covariation between the initial LOHAS items (Flora, LaBrish, & Chalmers, 2012). A substantial number of items were deleted that had factor loading below .60, cross-loadings above .40, or communality below .30 (Ford, MacCallum, & Tait, 1986; Hair, Black, Babin, & Anderson, 2010). The items that did not contribute to the parsimonious factor structure were also removed (Mueser, Curran, & McHugo, 1997). Removal of items was performed one at a time to determine which item needs to be eliminated in sequence based on the previous EFA results. The iterative process produced a final factor solution, and multiple factor extraction rules determined the number of underlying factors; scree test, minimum average partial, and Kaiser rule (Eigenvalues-greater-Than-One Rule) (Zwick, & Velicer, 1986).

After that, confirmatory factor analysis (CFA) was conducted using Structural Equation Modeling (SEM) with AMOS 24.0 to verify the factorial validity and dimensionality of the hypothesized LOHAS model (Jöreskog, Sörbom, du Toit, & du Toit, 2000). Hooper, Coughlan, and Mullen (2008) maintained that it is necessary to report a variety of model fit indices because they reflect a various aspect of model fit. They recommended reporting chi-square statistic, root

mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI), and parsimonious normed fit index (PNFI). They have been found the least sensitive to sample size, model misspecification and parameter estimates.

### ***1) South Korean students***

#### ***Exploratory factor analysis***

The factor analysis resulted in eight factors with eigenvalues exceeding 1 and explained 72.9% of the total variance. Cronbach's alpha values for the eight dimensions ranged from .78 to .89. All exceeded the .70 cut-off value advised by Nunnally and Bernstein (1994). The Kaiser-Meyer Olkin (KMO) value of .79 and a significant chi-square value for Bartlett's test of sphericity ( $\chi^2=2370.66, p<.001$ ) indicated that factor analysis was appropriate for the data. Table 2 presents the final factor solution and the list of items finally retained for confirmatory factor analysis.

Factor 1, labeled "*positivity and enjoyment*" assessed the extent to which an individual positively deals with situations and enjoys oneself and life. The positivity includes items involving positive outlook, positive attitude toward life, and positive coping with failure and frustration. The enjoyment includes items involving satisfaction from simple and everyday pleasures, enjoyment of things, ability to laugh and see the funny side, and cheerful feeling. All of these can be construed to represent the perceptual or behavioral skills to ensure one's emotional well-being. The reliability of this factor was  $\alpha=.89$ .

Factor 2, labeled "*environmentalism*" assessed the degree to which an individual considers the environmental impact in the purchase decision-making process. In particular, whether a product is designed and manufactured to be safe and healthy for the environment at the early stage of the product lifecycle is a primary concern here. For example, source responsibility, namely avoiding harmful substances, chemicals or compound and using reliable and sustainable materials, or integrating renewable energy sources into sourcing and manufacturing, is critical to the LOHASians. The reliability of this six item factor was  $\alpha=.89$ .

Factor 3, labeled "*physical fitness*" measured the extent to which an individual seeks healthy foods for one's physical healthiness. Healthy food behavior pertains to avoiding dietary products that have a harmful impact on cardiovascular fitness. Refraining from the foods with



high chemical ingredients, additives, saturated fat, or cholesterol indicates how carefully one chooses quality foods based on the nutrition facts. The information seeking behavior of reading the ingredients on food labels was also associated with this factor. The six-item factor produced reliability of  $\alpha = .88$ .

Factor 4, labeled “*stress control*” assessed the extent to which one copes actively with stress to enhance mental health. This reflects one’s multilateral efforts to manage the stress, including consciously reducing the stress and anxiety, using specific stress-relief methods, and spending a certain amount of time each day to manage the stress. The reliability of this factor was  $\alpha = .87$ .

Factor 5, entitled “*spirituality*” evaluated the degree to which an individual develops a deeper spiritual life. It measures how much a person is engaged in spiritual practices such as prayer, meditation, or self-reflection. This factor also assesses the level of one’s recognition of spiritual principle, “wholeness”, which represents a deeper feeling about the inter-connectedness of everything in the universe, including self, others, and transcendent power. The reliability of this factor was  $\alpha = .85$ .

Factor 6, entitled “*social interaction*” assessed the quality of interpersonal relations and the strength of the social affiliation. Whereas measuring the degree to which one has a good, meaningful, or close relationships with others focuses on the personal intimacy aspect of the social relationships, measuring the extent to which one participates in the social clubs or activities on a regular basis emphasizes more on the sense of belonging. This factor had reliability of  $\alpha = .78$ .

Factor 7, named “*social consciousness*”, evaluated the extent to which one takes into account the social and global community in one’s daily life. This reflected one’s awareness and openness to social or global issues. The reliability of this three-item factor was  $\alpha = .81$ .

Factor 8, labeled, “*socially responsible purchase*” assessed the degree to which one purchases products from companies that show social responsibility. This measures whether one uses a corporate’s social responsibility as a criterion in the purchase decision, and whether to perform purchase behavior aligning with one’s value. It is concerned with “action-orientation” that prompts one to engage in socially desirable behaviors. The reliability of this factor was  $\alpha = .85$ . Table 5 and 6 shows the results of the exploratory factor analysis of the LOHAS scale items in SK students sample.

Table 5. Exploratory factor analysis of the LOHAS items on the South Korean students sample

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	9.215	26.32	26.33	9.215	26.32	26.33	4.518	12.91	12.91
2	4.11	11.73	38.06	4.11	11.73	38.06	4.22	12.05	24.96
3	3.13	8.93	44.99	3.13	8.93	44.99	3.99	11.41	36.37
4	2.7	7.69	54.68	2.7	7.69	54.68	3.24	9.26	45.63
5	2.3	6.56	61.24	2.3	6.56	61.24	2.91	8.31	53.94
6	1.6	4.53	65.77	1.6	4.53	65.77	2.53	7.23	61.16
7	1.3	3.69	69.46	1.3	3.69	69.46	2.25	6.44	67.60
8	1.2	3.43	72.89	1.2	3.43	72.89	1.85	5.29	72.89

Table 6. Rotated component matrix for the South Korean students sample

		Component							
		1	2	3	4	5	6	7	8
Q3.5	I think positively of life.	.833							
Q3.6	I try to cope with positively on failure and frustration.	.797							
Q3.4	I try to take positive outlook on things.	.787							
Q3.10	I enjoy things.	.718							
Q3.8	I get satisfaction from simple, everyday pleasures.	.716							
Q3.9	I am able to laugh and see funny side.	.667							
Q3.11	I feel cheerful.	.612							
Q7.13	I prefer products manufactured in sustainable ways.		.871						
Q7.14	I choose sustainable source products over conventional ones.		.786						
Q7.11	My purchase decisions are based on its effect on the world.		.754						
Q7.12	I choose environmentally friendly products.		.752						
Q7.10	I prefer products made of recycled materials.		.715						
Q7.8	I am interested in renewable energy sources.		.701						
Q1.7	I avoid foods with high additives.			.841					
Q1.5	I choose a diet low in fat, saturated fat, or cholesterol.			.831					
Q1.3	I purchase and eat foods considering my health.			.761					
Q1.8	I worry that there are harmful chemicals in my food.			.758					
Q1.4	I limit foods like sugar, coffee, fats, etc.			.722					
Q1.9	I usually read the ingredients on food labels.			.706					
Q2.5	I use specific methods to control my stress.				.858				
Q2.3	I try to control stress.				.801				
Q2.4	I reduce stress and anxiety.				.796				
Q2.6	I spend time each day trying to reduce accumulated stress.				.751				
Q6.4	I nurture the spiritual aspects of myself.					.860			
Q6.3	I feel connected with some force greater than myself.					.824			
Q6.5	I spend portion of every day in prayer, meditation, or personal reflection.					.780			
Q6.6	I feel sense of connectedness with other human beings.					.687			

Table 6 continued

		Component							
		1	2	3	4	5	6	7	8
Q4.2	I have good and meaningful relationship with others.						.843		
Q4.1	I am close with family, friends, colleagues, and neighbors.						.819		
Q4.3	I attend club or social activities on a regular basis.						.656		
Q8.3	I consider the entire world and population in daily life.							.794	
Q8.2	I consider local society and its members in daily life.							.784	
Q8.1	I'm socially conscious.							.739	
Q8.4	I buy products from companies with values like my own.								.783
Q8.5	When purchasing products, I depend on whether a company perceives its own social responsibility.								.745

### *Confirmatory factor analysis*

It was found that the hypothesized model proposed by EFA consisted of the first order and eight-factor structure. Specifically, the model comprised eight latent variables (i.e., environmentalism, physical fitness, stress control, positivity and enjoyment, social interaction, spirituality, social consciousness, socially responsible purchase) with the observed variables loading on the respective latent variables accordingly as revealed in the EFA analysis.

Figure 2 shows the results of the CFA model. The results confirmed the dimensionality of 35-item, eight-dimension scale ( $\chi^2 (528) = 805.313, p < .001, RMR = .09, CFI = .83, TLI = .81, RMSEA = .07$ ). A model is said to possess less than the good fit to the data given that mixed results emerged for the model fit indices (i.e., it is said that a model has a good fit to the data when RMR is less than .10, CFI is greater than .90, TLI exceeds .90, RMSEA is less than .10 (Bentler, 1990)).

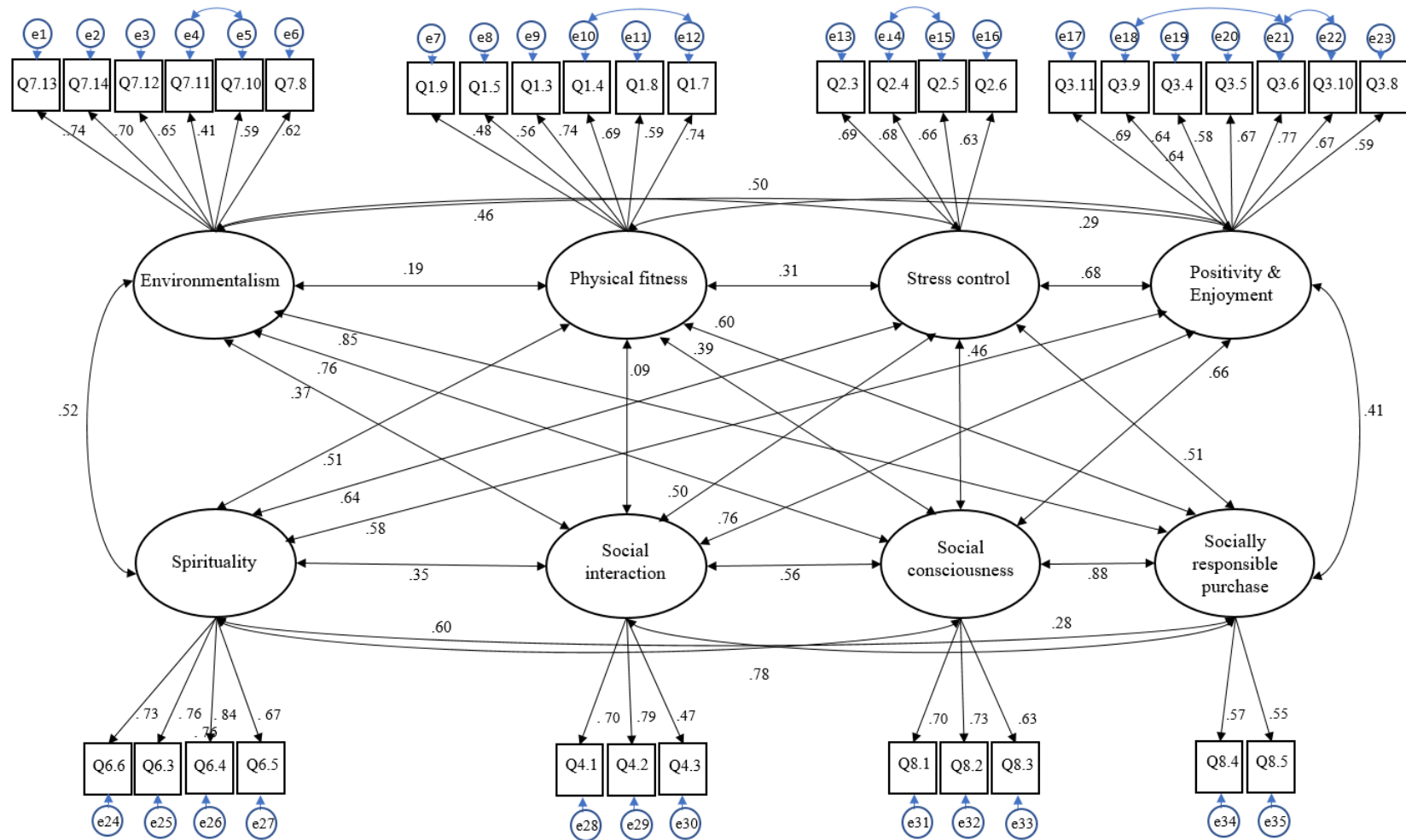


Figure 2. CFA for SK students

## 2) US students

### *Exploratory factor analysis*

The factor analysis resulted in eight factors with eigenvalues exceeding 1, explaining 66.7% of the total variance. Cronbach's alpha values for the eight dimensions ranged from .72 to .94. All exceeded the .70 cut-off value advised by Nunnally and Bernstein (1994). The Kaiser-Meyer Olkin (KMO) value of .83 and a significant chi-square value for Bartlett's test of sphericity ( $\chi^2=3549.97$ ,  $p<.001$ ) indicated that factor analysis was appropriate for the data. Table 3 presents the final factor solution and the list of items finally retained for confirmatory factor analysis.

Factor 1, labeled "*environmentalism*", was conceptualized and measured as the extent to which one has an interest in the product and produce sustainability, as well as the degree to which one integrates the environmental protection practices into their daily lives (recycling). Moreover, the willingness to sacrifice for the environment is reflected in this factor, including paying a price premium and willingness to reduce the consumption level for environmental protection. Sharing the information with one's circle on the advantages of environmentally friendly products and believing that an individual's small efforts can make a difference for the environment were also captured in this factor. The reliability of this factor was  $\alpha=.94$ .

Factor 2, named "*stress control*", assessed the extent to which one copes actively with the stress to enhance mental health. This reflects one's multilateral efforts to manage the stress, including consciously reducing the stress and anxiety, using specific stress-relief methods, and spending a certain amount of time each day to manage the stress. Taking some time for relaxation each day was found to be one type of stress-relieving methods in the US student sample. The reliability of this factor was  $\alpha=.82$ .

Factor 3, labeled "*physical fitness*" measured the extent to which an individual seeks healthy foods for one's physical healthiness. Healthy food behavior pertains to avoiding dietary products that harm cardiovascular fitness. Refraining from the foods with high chemical ingredients, additives, saturated fat, or cholesterol indicates how carefully one chooses quality foods based on the nutrition facts. Also, an evaluation of the nutritional balance of one's daily diet was found to be related to this factor. The five-item factor produced reliability of  $\alpha=.80$ .

Factor 4, entitled "*spirituality*" evaluated the degree to which an individual develops a deeper spiritual life. It measures how much a person is engaged in spiritual practices such as

prayer, meditation, or self-reflection. This factor also assesses the level of one's recognition of spiritual principle, "wholeness", which represents a deeper feeling about the interconnectedness of everything in the universe, including self, others, and transcendent power. A notable thing here is that the US students tended to recognize the wholeness in terms of the connectedness with some force greater than themselves rather than the connectedness with other human beings. The reliability of this factor was  $\alpha=.89$ .

Factor 5, labeled "*positivity*" assessed the extent to which individual deals positively with situations to ensure emotional well-being. This involves a positive outlook, positive attitude toward life, and positive coping with failure and frustration. It is more about the perceptual or behavioral skills for the positive management of one's emotions rather than the evaluation of one's emotional state. The reliability of this three-item factor was  $\alpha=.83$ .

Factor 6, labeled, "*socially responsible purchase*" assessed the degree to which one purchases products from companies that show socially responsible practices. This captures whether to use a corporate's social responsibility as a criterion in the purchase decision, whether to perform purchase behavior aligning with one's value, and willingness to pay a price premium for the products from socially responsible companies. These measure "action-orientation" that prompts one to engage in socially desirable behaviors. The reliability of this factor was  $\alpha=.81$ .

Factor 7, named "*social consciousness*", assessed the extent to which one takes into account the social and global community in one's daily life. This reflects one's awareness and openness to social or global issues. The reliability of this three-item factor was  $\alpha=.82$ .

Factor 8, labeled "*enjoyment*", evaluated the degree to which one enjoys oneself and life (Fujiwara, 2007). It pertains to whether to get satisfied from simple and everyday pleasures, enjoy things, be able to laugh and see the funny side and participate in everything with zeal. This factor had reliability of  $\alpha=.72$ . Table 7 and 8 shows a summary of the exploratory factor analysis of the LOHAS scale items in the U.S. students sample.



Table 7. Exploratory factor analysis of LOHAS items on the US students sample

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	9.852	24.63	24.63	9.852	24.63	24.63	7.49	18.74	18.74
2	4.31	10.77	35.40	4.31	10.77	35.40	3.48	8.72	27.46
3	2.79	6.97	42.37	2.79	6.97	42.37	3.01	7.53	34.99
4	2.71	6.78	49.15	2.71	6.78	49.15	2.68	6.71	41.70
5	2.30	5.74	54.89	2.30	5.74	54.89	2.59	6.49	48.19
6	1.89	4.73	59.62	1.89	4.73	59.62	2.59	6.47	54.66
7	1.44	3.59	63.21	1.44	3.59	63.21	2.47	6.20	60.86
8	1.38	3.45	66.66	1.38	3.45	66.66	2.33	5.8	66.66

Table 8. Rotated component matrix for the US students sample

		Component							
		1	2	3	4	5	6	7	8
Q7.13	I prefer products manufactured in sustainable ways.	.819							
Q7.12	I choose environmentally friendly products.	.818							
Q7.10	I prefer products made of recycled materials.	.816							
Q7.14	I choose sustainable source products over conventional ones.	.807							
Q7.8	I am interested in renewable energy sources.	.767							
Q7.11	My purchase decisions are based on its effect on the world.	.747							
Q7.21	I would be willing to reduce my consumption to help protect the environment.	.716							
Q7.1	I protect the environment.	.663							
Q7.2	I prefer sustainable agriculture practices.	.660							
Q7.20	I believe that my small practices can make a difference in addressing environmental protection.	.657							
Q7.18	I teach the benefits of environmentally friendly products to family or friends.	.655							
Q7.9	I recycle paper, glass or plastic container.	.651							
Q7.19	I am willing to pay an additional 20% for sustainably manufactured products.	.636							
Q2.1	I take some time for relaxation each day.		.770						
Q2.6	I spend time each day trying to reduce accumulated stress.		.746						
Q2.3	I try to control stress.		.714						
Q2.4	I reduce stress and anxiety.		.713						
Q2.5	I use specific methods to control my stress.		.640						
Q1.3	I purchase and eat foods considering my health.			.790					
Q1.2	My daily meals are nutritionally balanced.			.767					
Q1.5	I choose a diet low in fat, saturated fat, or cholesterol.			.738					
Q1.7	I avoid foods with high additives.			.713					
Q1.4	I limit foods like sugar, coffee, fats, etc.			.690					
Q6.4	I nurture the spiritual aspects of myself.				.913				
Q6.3	I feel connected with some force greater than myself.				.860				

Table 8 continued

		Component							
		1	2	3	4	5	6	7	8
Q6.5	I spend a portion of every day in prayer, meditation, or personal reflection.				.816				
Q3.4	I try to take a positive outlook on things.					.867			
Q3.5	I think positively of life.					.836			
Q3.6	I try to cope with positively on failure and frustration.					.707			
Q8.6	I would pay a premium to buy the products of a company that shows ethically and socially responsible practices.						.768		
Q8.4	I buy products from companies with values like my own.						.723		
Q8.5	When purchasing products, I depend on whether a company perceives its own social responsibility.						.664		
Q8.2	I consider the local society and its members in daily life.							.846	
Q8.3	I consider the entire world and population in daily life.							.779	
Q8.1	I'm socially conscious.							.764	
Q3.8	I get satisfaction from simple, everyday pleasures.								.791
Q3.10	I enjoy things.								.738
Q3.9	I am able to laugh and see the funny side.								.685
Q3.7	I participate in everything with zeal.								.610

### *Confirmatory factor analysis*

It was found that the hypothesized model proposed by EFA consisted of the first order and eight-factor structure. Specifically, the model comprised eight latent variables (i.e., environmentalism, physical fitness, stress control, positivity, enjoyment, spirituality, social consciousness, socially responsible purchase) with the observed variables loading on the respective latent variables accordingly as revealed in the EFA analysis.

Figure 3 shows the results of the CFA model. The results confirmed the dimensionality of 39-item, eight-dimension scale ( $\chi^2_{(662)} = 960.935, p < .001$ , RMR = .09, CFI = .91, TLI = .90, RMSEA = .05). A model is said to possess good fit to the data considering RMR is less than .10, CFI is greater than .90, TLI exceeds .90, RMSEA is less than .10 (Bentler, 1990).

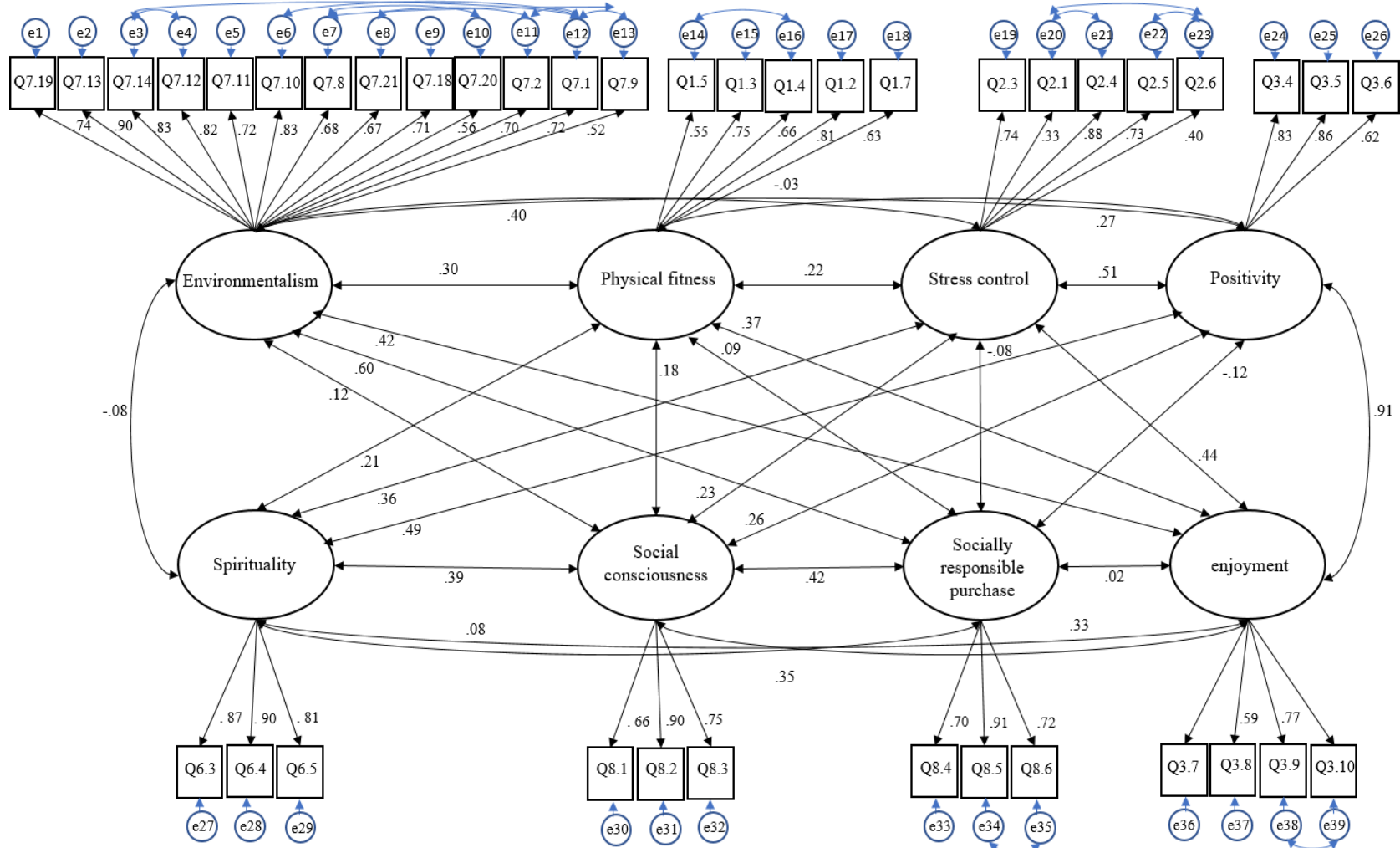


Figure 3. CFA for US students

### 3) *General US population*

#### *Exploratory factor analysis*

The factor analysis resulted in seven factors with eigenvalues exceeding 1, explaining 69.9% of the total variance. Cronbach's alpha values for the eight dimensions ranged from .56 to .93. The Kaiser-Meyer Olkin (KMO) value of .89 and a significant chi-square value for Bartlett's test of sphericity ( $\chi^2=4208.36$ ,  $p<.001$ ) indicated that factor analysis was appropriate for the data. Table 4 presents the final factor solution and the list of items finally retained for confirmatory factor analysis.

Factor 1, labeled "*environmentalism*", was conceptualized and measured as the extent to which one has an interest in the product and produce sustainability, in addition to the degree to which one integrates the environmental protection practices into their daily lives (recycling). Moreover, the willingness to sacrifice for the environment was reflected in this factor, including paying a price premium and reducing consumption level for environmental protection. Sharing the information with one's circle on the advantages of environmentally friendly products and believing that an individual's small efforts can make a difference for the environment were also captured in this factor. The reliability of this factor was  $\alpha = .93$ .

Factor 2, labeled "*positivity and enjoyment*" assessed the extent to which individual deals positively with situations and enjoys oneself and life. The positivity includes items involving positive outlook, positive attitude toward life, and positive coping with failure and frustration. The enjoyment includes items involving satisfaction from simple and everyday pleasures, enjoyment of things, ability to laugh and see the funny side, and cheerful feeling. These two sub-concepts did not appear as separate factors as was expected based on the factor structure from the US students sample. This is perhaps because respondents considered both positivity and enjoyment as one global perceptual or behavioral skills to increase one's emotional well-being. The reliability of this factor was  $\alpha = .83$ .

Factor 3, labeled "*stress control*", assessed the extent to which one copes actively with the stress to enhance mental health. This reflects one's multilateral efforts to manage the stress, including consciously reducing the stress and anxiety, using specific stress-relief methods, and spending a certain amount of time each day to manage the stress. The reliability of this factor was  $\alpha = .81$ .

Factor 4, labeled “*physical fitness*” measured the extent to which an individual puts an effort to improve and to maintain one’s physical health. Most of the loaded items were used to describe healthy eating behaviors, which is relevant to avoid the dietary products that harm the cardiovascular fitness. The items such as limiting foods like sugar, coffee, fats, and refraining from the foods containing harmful ingredients like saturated fat or cholesterol were involved in this factor. Furthermore, an evaluation (perception) on the nutritional balance of one’s daily diet was found to be related to this factor. Regular exercise was revealed as an important item that measures physical fitness management. This factor contained five items and had the reliability of  $\alpha = .74$ .

Factor 5, entitled “*spirituality*” evaluated the degree to which an individual develops a deeper spiritual life. It measures how much a person is engaged in spiritual practices such as prayer, meditation, or self-reflection. This factor also assesses the level of one’s recognition of spiritual principle, “wholeness”, which represents a deeper feeling about the interconnectedness of everything in the universe, including self, others, and transcendent power. The notable thing is that the general US population tended to recognize the wholeness in terms of the connectedness with some force greater than themselves rather than the connectedness with other human beings. The reliability of this three-item factor was  $\alpha = .89$ .

Factor 6, labeled “*intellectual stimulation*” assessed the extent to which one is intellectually active. It includes items measuring the importance of intellectual challenges in one’s overall well-being, a degree of reading about diverse topics and enjoying new experiences and challenges. This was found a factor emerged only in the general US population sample. The factor contained three items and had the reliability of  $\alpha = .56$ .

Factor 7, named “*social consciousness*”, assessed the extent to which one takes into account the social and global community in one’s daily life. This reflects one’s awareness and openness to social or global issues. The reliability of this three-item factor was  $\alpha = .82$ . Table 9 and 10 shows a summary of exploratory factor analysis of the LOHAS scale items in U.S. general population.

Table 9. Exploratory factor analysis of LOHAS items on the general US population sample

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	13.871	35.57	35.57	13.871	35.57	35.57	7.70	19.74	19.74
2	3.60	9.23	44.80	3.60	9.23	44.80	5.28	13.53	33.28
3	2.94	7.53	52.33	2.94	7.53	52.33	3.34	8.55	41.83
4	2.22	5.68	58.01	2.22	5.68	58.01	3.30	8.45	50.28
5	1.82	4.66	62.67	1.82	4.66	62.67	2.85	7.30	57.58
6	1.58	4.06	66.73	1.58	4.06	66.73	2.60	6.56	64.14
7	1.23	3.16	69.89	1.23	3.16	69.89	2.24	5.75	69.89



Table 10. Rotated component matrix for the general US population sample

		Component						
		1	2	3	4	5	6	7
Q7.13	I prefer products manufactured in sustainable ways.	.833						
Q7.14	I choose sustainable source products over conventional ones.	.825						
Q7.20	I believe that my small practices can make a difference in addressing environmental protection.	.798						
Q7.12	I choose environmentally friendly products.	.786						
Q7.11	My purchase decisions are based on its effect on the world.	.723						
Q7.19	I am willing to pay an additional 20% for sustainably manufactured products.	.711						
Q7.21	I would be willing to reduce my consumption to help protect the environment.	.710						
Q7.10	I prefer products made of recycled materials.	.690						
Q7.18	I teach the benefits of environmentally friendly products to family or friends.	.660						
Q7.8	I am interested in renewable energy sources.	.659						
Q7.3	I buy organically grown produce.	.647						
Q7.1	I protect the environment.	.646						
Q3.5	I think positively of life.		.844					
Q3.11	I feel cheerful		.825					
Q3.10	I enjoy things.		.803					
Q3.4	I try to take positive outlook on things.		.763					
Q3.8	I get satisfaction from simple, everyday pleasures.		.700					
Q3.6	I try to cope with positively on failure and frustration.		.696					
Q3.9	I am able to laugh and see funny side.		.676					
Q2.6	I spend time each day trying to reduce accumulated stress.			.794				
Q2.5	I use specific methods to control my stress.			.784				
Q2.3	I try to control stress.			.681				
Q2.4	I reduce stress and anxiety.			.656				
Q1.2	My daily meals are nutritionally balanced.				.734			
Q1.4	I limit foods like sugar, coffee, fats, etc.				.730			

Table 10 continued

		Component						
		1	2	3	4	5	6	7
Q1.3	I purchase and eat foods considering my health.				.730			
Q1.5	I choose a diet low in fat, saturated fat, or cholesterol.				.663			
Q1.1	I exercise regularly.				.643			
Q6.5	I spend portion of every day in prayer, meditation, or personal reflection.					.894		
Q6.3	I feel connected with some force greater than myself.					.888		
Q6.4	I nurture the spiritual aspects of myself.					.886		
Q5.4	I have generally found intellectual challenges to be vital to my overall well-being.						.782	
Q5.3	I read about different topics from a variety of newspapers, magazines and books.						.658	
Q5.2	I enjoy new experiences and challenges.						.624	
Q8.2	I consider local society and its members in daily life.							.786
Q8.3	I consider the entire world and population in daily life.							.732
Q8.1	I'm socially conscious.							.691

### *Confirmatory factor analysis*

It was found that the hypothesized model proposed by EFA consisted of the first order and seven-factor structure. Specifically, the model comprised seven latent variables (i.e., environmentalism, physical fitness, stress control, positivity and enjoyment, social interaction, spirituality, social consciousness, intellectual stimulation) with the observed variables loading on the respective latent variables accordingly as revealed in the EFA analysis.

Figure 4 shows the results of the CFA model. The results confirmed the dimensionality of 37-item, eight-dimension scale ( $\chi^2_{(594)} = 977.889, p < .001, \text{RMR} = .09, \text{CFI} = .89, \text{TLI} = .88, \text{RMSEA} = .07$ ). A model is said to have less than the good fit to the data given that mixed results emerged for the model fit indices (i.e., model is said to have a good fit to the data when RMR is less than .10, CFI is greater than .90, TLI exceeds .90, RMSEA is less than .10 (Bentler, 1990).

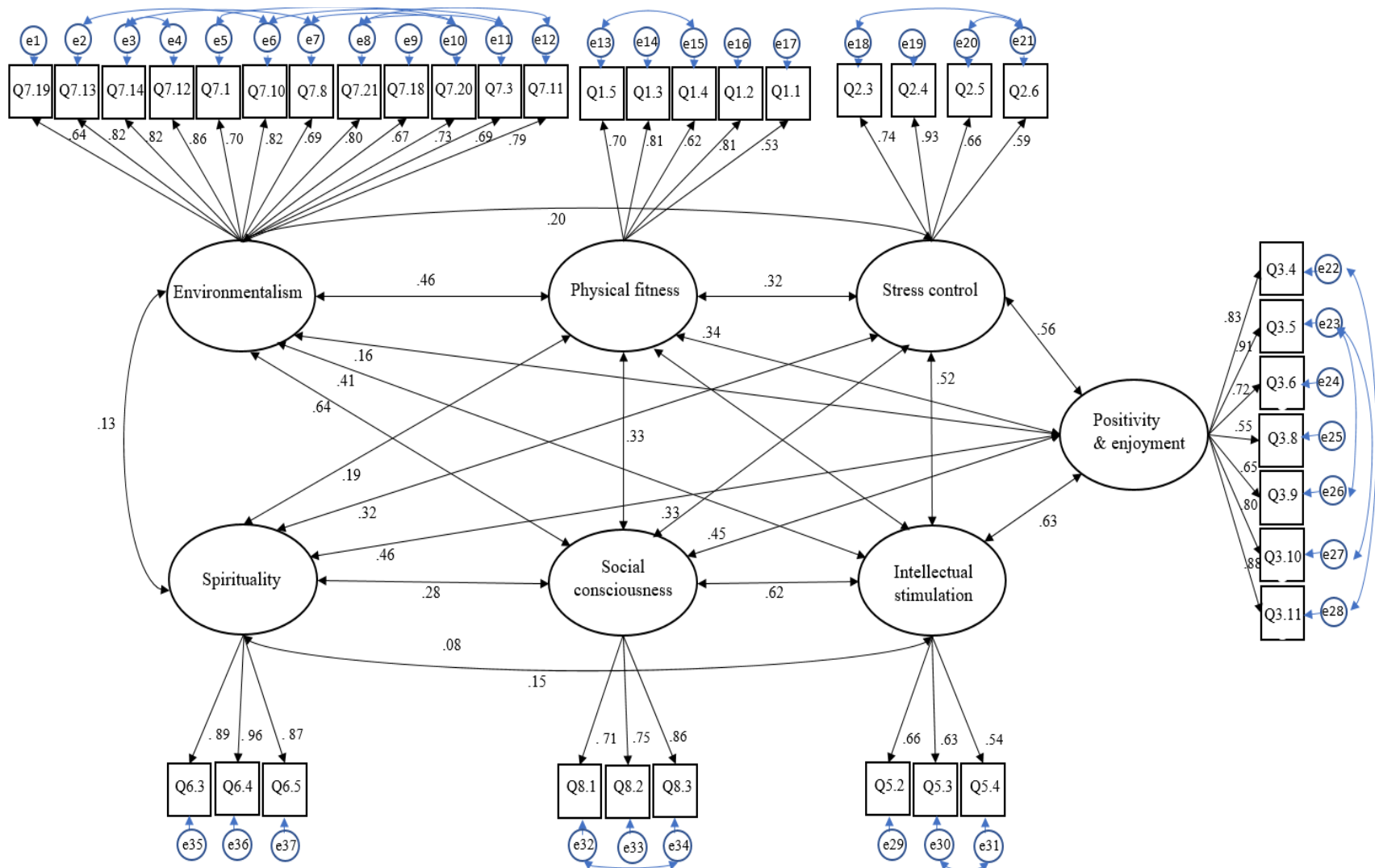


Figure 4. CFA for general US population

#### **4.4 Derived LOHAS scale – common items across the three different cultural groups**

The CFA for the LOHAS scales developed in the SK students at Purdue, US students at Purdue, and general US population yielded 35 items in the SK students, 39 in the US students, and 37 in the general US population. Item review indicated that 25 items are common to three different groups and these items loaded across six common dimensions: environmentalism (6 items), physical fitness (3 items), stress control (4 items), positivity (6 items), and social consciousness (3 items), and spirituality (3 items).

For twenty-five items configural invariance was tested across three groups using multi-group CFA. Configural invariance indicates that the number of underlying factors of the scale and patterns of item loadings on each factor are equal across groups (Grunert, 1995; Ford, Merchant, Bartier, & Friedman, 2018). This implies that respondents from different groups conceptualize LOHAS in the same way (Milfont & Fischer, 2010). Configural invariance is established when 1) the multi-group CFA produces a measurement model with acceptable model fit 2) all factor loadings are statistically significant and above cut-off points, and 3) the construct under investigation shows discriminant validity (Ford, Merchant, Bartier, & Friedman, 2018; Steenkamp & Baumgartner, 1998)

The common item-derived LOHAS scale demonstrated acceptable or slightly less than the good fit to the data (CMIN/DF=1.797, CFI= .887, TLI= .870, RMSEA= .043). The item loadings for each factors were statistically significantly large in US students and general US population but not in SK students (American students at purdue: .52- .91, AVE environmentalism= .68, AVE physical fitness= .48, AVE positivity= .52, AVE stress control= .53, AVE spirituality = .75, AVE social consciousness = .60; American general population: .57- .96; AVE environmentalism= .64, AVE physical fitness= .59, AVE positivity& enjoyment= .55, AVE stress control= .61, AVE spirituality = .82, AVE social consciousness = .55; SK students at purdue; .42-.86, AVE environmentalism= .38, AVE physical fitness= .45, AVE positivity& enjoyment= .43, AVE stress control= .44, AVE spirituality = .60, AVE social consciousness = .47). Further, discriminant validity was established in the US students and general US population but not in the SK students. These results revealed that the common item-derived LOHAS scale does not show configural invariance.

## **4.5 One global LOHAS scale with pooled data**

Since the LOHAS scale did not show configural invariance across different cultural groups, it is decided to develop one standard global LOHAS scale based on the pooled sample.

### **4.5.1 Purification and reliability**

#### ***Data***

Of the 855 surveys, 200 were used for the item purification. Two hundred respondents were chosen because similar sample size was used to purify initial items among the scale developers in the marketing area (Parasuraman, Zeithaml, & Berry, 1988).

#### ***Analysis***

The analysis was done the same as it was done in the previous chapter.

#### ***Results***

A total of 65 items remained. The number of remaining items for each LOHAS dimension was nine for physical health, six for mental health, eight for emotional health, five for social health, five for intellectual health, eight for spiritual health, seventeen for environmental sustainability, and seven for social sustainability.

Cronbach's  $\alpha$  for each LOHAS dimension is presented below in Table 11: physical health with .84; mental health with .85, emotional health with .89; social health with .76; intellectual health with .75; spiritual health with .84; environmental sustainability with .93; social sustainability with .87. Table 11 shows a summary of the reliability of LOHAS scale items.

Table 11. Scale reliabilities and associated statistics

Development sample ( <i>n</i> = 200)					
	No. of items	Cronbach's $\alpha$	Mean <sup>a</sup>	S.D.	Item-total correlation
Physical health	9	.84	3.5	1.2	.66
Mental health	6	.85	3.4	1.2	.76
Emotional health	8	.89	4.0	1.0	.72
Social health	5	.76	3.4	1.2	.28
Intellectual health	5	.75	4.1	0.9	.15
Spiritual health	8	.84	3.6	1.1	.68
Environmental sustainability	17	.93	3.5	1.1	.67
Social sustainability	7	.87	3.5	1.1	.75

<sup>a</sup> Mean scale score=sum of items/number of items.

#### 4.5.2 Exploratory factor analysis

##### *Data*

Out of the remaining 655 survey data, 319 were used for exploratory factor analysis. In academia, two criteria have been used to determine the minimum sample size for factor analysis; one emphasizes the importance of absolute number of cases ( $N$ ) (e.g., Guilford, 1954; O'Rourke & Hatcher, 2013) and the other stresses the subject-to-variable (STV) ratio (e.g., Cattell, 2012). In this study, Cattell (2012)'s recommendation was adopted. He suggested the minimum desirable sample size of 250, and also claimed that a ratio of 3(:1) to 6(:1) of the STV ratio is acceptable. Considering that the LOHAS concept consists of 65 initial variables, STV ratio of 4.6: 1 is established when 319 responses are used for EFA.

##### *Analysis*

The analysis was done the same as it was done in the previous chapter.

##### *Results*

The final factor analysis resulted in eight factors with eigenvalues exceeding 1, explaining 72.0% of the total variance. Cronbach's alpha values for the eight dimensions ranged from .70 to .91. All exceeded the .70 cut-off value advised by Nunnally and Bernstein (1994). The Kaiser-Meyer Olkin (KMO) value of .87 and a significant chi-square value for Bartlett's test of sphericity ( $\chi^2=6926.56$ ,  $p<.001$ ) indicated that factor analysis is appropriate for the data. Table 5 and Table 6 present the final factor solution and the list of items finally retained for confirmatory factor analysis.

Factor 1, labeled "*environmentalism*" assessed the degree to which one reflects environmental concerns in their daily activities. It captures the extent to which one purchases a product based on its environmental impact on the earth and how likely they inform the benefit of sustainable products to people around them. Also, it involves the willingness to reduce consumption for environmental reasons and the use of energy sources. The reliability of this eight-item factor was  $\alpha=.92$ .

Factor 2, labeled "*physical fitness*" measured the extent to which an individual consumes food considering their health. It pertains not only to avoid, reduce, and limit diet that contains



harmful ingredients or chemical compounds (negative avoidance) but to have a quality meal (positive orientation). The five-item factor produced reliability of  $\alpha = .82$ .

Factor 3, labeled “*stress control*” assessed the extent to which one puts an effort to manage stress for mental health. This has to do with whether one spends a certain amount of time a day to reduce stress, has their way for stress control, and not overwhelmed by the stress but consciously aware this and trying to manage it. The reliability of this factor was  $\alpha = .83$ .

Factor 4, labeled “*positivity*” assessed the extent to which individual deals with situations in a positive way. Positive thoughts toward life, positive outlook on things, and positive coping with failure and frustration are involved with this factor. It reflects the perceptual or behavioral skills to increase one’s emotional well-being. The reliability of this factor was  $\alpha = .86$ .

Factor 5, entitled “*spirituality*” evaluated the degree to which one appreciates and fosters the spiritual aspect of oneself. It includes the items measuring the level of feeling connected with transcendent power, engaging in the spiritual practices on a daily basis, including prayer, meditation, or personal reflection. The reliability of this factor was  $\alpha = .89$ .

Factor 6, entitled “*social interaction*” assessed the extent to which one has a quality relationship with others and is involved in social affiliation. It measures the level of interpersonal intimacy by asking how likely they have good, meaningful, or close relationships with people around them and the sense of belonging using the question asking the frequency of participating in a club or social activities. This factor had reliability of  $\alpha = .76$ .

Factor 7, named “*social consciousness*”, evaluated the extent to which one considers social and global community and members in one’s daily life. The reliability of this three-item factor was  $\alpha = .83$ .

Factor 8, named “*intellectual stimulation*”, evaluated the degree to which one enjoys intellectual activities and sees it important in their overall well-being. The reliability of this two-item factor was  $\alpha = .70$ . Table 12 and 13 shows the results of the exploratory factor analysis of the LOHAS scale on the pooled sample.

Table 12. Exploratory factor analysis of the LOHAS items on a pooled sample

Component	Initial eigen values			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	8.64	27.90	27.90	8.64	27.90	27.90	5.44	17.54	17.54
2	3.48	11.23	39.13	3.48	11.23	39.13	3.08	9.92	27.46
3	2.39	7.70	46.83	2.39	7.70	46.83	2.79	9.01	36.47
4	2.09	6.74	53.57	2.09	6.74	53.57	2.55	8.23	44.70
5	1.87	6.05	59.62	1.87	6.05	59.62	2.53	8.17	52.87
6	1.44	4.64	64.26	1.44	4.64	64.26	2.21	7.11	59.98
7	1.35	4.35	68.61	1.35	4.35	68.61	2.14	6.91	66.89
8	1.05	3.39	72.00	1.05	3.39	72.00	1.58	5.11	72.00

Table 13. Rotated component matrix for a pooled sample

		Component							
		1	2	3	4	5	6	7	8
Q7.13	I prefer products manufactured in sustainable ways.	<b>.84</b>	.14	.11	-.04	.00	.08	.09	.04
Q7.14	I choose sustainable source products over conventional ones.	<b>.83</b>	.12	.15	.03	.00	.05	.14	.00
Q7.12	I choose environmentally friendly products.	<b>.82</b>	.17	.05	.03	.07	.03	.11	.08
Q7.11	My purchase decisions are based on its effect on the world.	<b>.78</b>	.09	.17	.04	.13	-.00	.17	-.03
Q7.10	I prefer products made of recycled materials.	<b>.77</b>	.06	.14	.01	.04	.10	.10	.17
Q7.8	I am interested in renewable energy sources.	<b>.72</b>	.10	-.06	.16	-.04	.04	.00	.26
Q7.21	I would be willing to reduce my consumption to help protect the environment.	<b>.70</b>	.11	.05	.15	.01	-.02	.21	.02
Q7.18	I teach the benefits of environmentally friendly products to family or friends.	<b>.69</b>	.10	.14	-.02	.10	.06	.16	.07
Q1.5	I choose a diet low in fat, saturated fat, or cholesterol.	.08	<b>.77</b>	.12	.02	.07	-.02	.07	-.04
Q1.3	I purchase and eat foods considering my health.	.14	<b>.77</b>	.00	.16	.01	.09	.07	-.04
Q1.4	I limit foods like sugar, coffee, fats, etc.	.12	<b>.76</b>	.16	.04	-.00	.02	.08	-.01
Q1.2	My daily meals are nutritionally balanced.	.13	<b>.70</b>	.01	.07	.05	.12	-.07	.17
Q1.7	I avoid foods with high additives.	.21	<b>.70</b>	.11	.11	.19	.01	-.01	.02
Q2.5	I use specific methods to control my stress.	.18	.09	<b>.80</b>	-.00	.14	.05	.01	.03
Q2.6	I spend time each day trying to reduce accumulated stress.	.16	.16	<b>.80</b>	-.05	.12	.04	.04	.04
Q2.3	I try to control stress.	.11	.07	<b>.77</b>	.24	.03	.01	.02	.08
Q2.4	I reduce stress and anxiety.	.13	.09	<b>.73</b>	.36	.05	.09	.09	.01
Q3.5	I think positively of life.	.04	.16	.09	<b>.85</b>	.13	.18	.06	.01
Q3.4	I try to take positive outlook on things.	.11	.14	.08	<b>.85</b>	.13	.18	.06	.01
Q3.6	I try to cope with positively on failure and frustration.	.05	.09	.20	<b>.77</b>	.12	.16	.02	.02
Q6.4	I nurture the spiritual aspects of myself.	.07	.10	.08	.15	<b>.89</b>	.10	.09	.07
Q6.3	I feel connected with some force greater than myself.	.04	.05	.04	.18	<b>.87</b>	.16	.09	-.00
Q6.5	I spend portion of every day in prayer, meditation, or personal reflection.	.09	.12	.21	.02	<b>.85</b>	.02	.02	.03
Q4.2	I have god and meaningful relationship with others.	.11	.11	.09	.21	.02	<b>.83</b>	.11	.06
Q4.1	I am close with family, friends, colleagues, and neighbors.	.04	.07	.12	.21	.08	<b>.83</b>	.06	.03

Table 13 continued

		Component							
		1	2	3	4	5	6	7	8
Q4.3	I attend club or social activities on a regular basis.	.05	.01	-.03	.08	.16	<b>.73</b>	.15	-.03
Q8.2	I consider local society and its members in daily life.	.25	.03	-.00	.09	.09	.15	<b>.82</b>	.11
Q8.1	I'm socially conscious.	.30	.12	.07	.09	.03	.13	<b>.76</b>	.17
Q8.3	I consider the entire world and population in daily life.	.36	.00	.09	-.01	.11	.12	<b>.75</b>	.10
Q5.4	I have generally found intellectual challenges to be vital to my overall well-being.	.21	.11	.06	.10	.03	.06	.16	<b>.82</b>
Q5.3	I read about different topics from a variety of newspapers, magazines and books.	.16	.05	.08	.00	.05	-.01	.15	<b>.81</b>

### 4.5.3 Confirmatory factor analysis

#### *Data*

The data from 336 surveys were used for confirmatory factor analysis. This met the recommendation by Cattell (2012) that the ratio of a minimum sample size to the number of variables being analyzed should be more than 3:1.

#### *Analysis*

The analysis was done the same as it was done in the previous chapter.

#### *Results*

It was found that the hypothesized model proposed by EFA consisted of the first order and eight-factor structure. Specifically, the model comprised eight latent variables (i.e., environmentalism, physical fitness, stress control, positivity, social interaction, intellectual stimulation, spirituality, social consciousness) with the observed variables loading on the respective latent variables accordingly as revealed in the EFA analysis.

Figure 5 shows the results of the CFA model. The results confirmed the dimensionality of 31-item, eight-dimension scale ( $\chi^2_{(402)} = 765.804, p < .001$ , RMR = .07, CFI = .94, TLI = .94, RMSEA = .046). A model is said to have an excellent fit to the data if the RMR is less than .10, CFI is greater than .90, TLI exceeds .90, RMSEA is less than .10 (Bentler, 1990; HDFS628). Considering of the criteria aforementioned, the eight-dimensional LOHAS model produced a good model fit to the data and confirmed the underlying factor structure of the LOHAS scale.

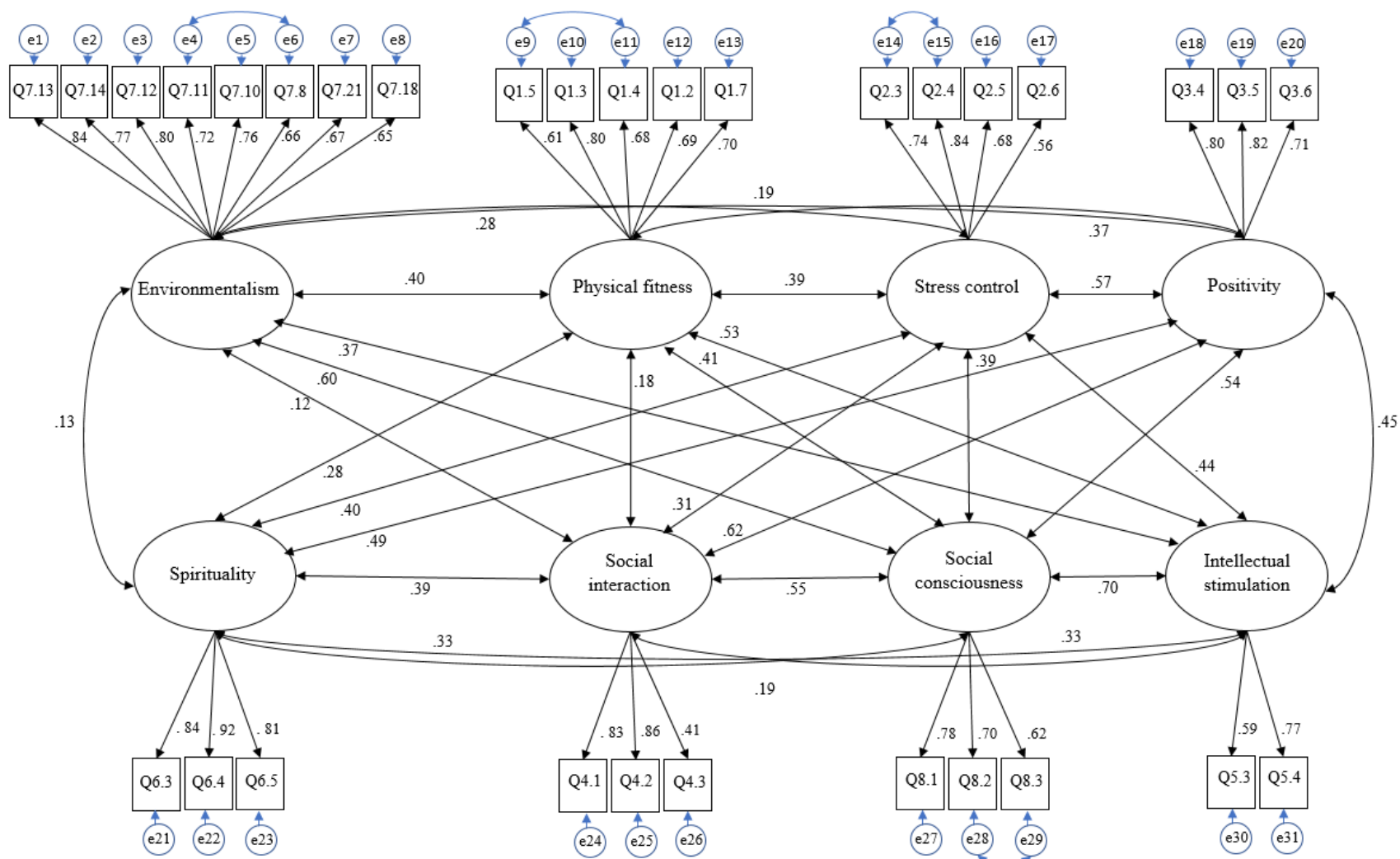


Figure 5. First-order eight-factor model

#### **4.5.4 Psychometric properties of the LOHAS scale**

##### ***1) Reliability***

###### *Analysis*

Composite reliability (CR) and average variance extracted (AVE) were calculated to assess the reliability of the LOHAS scale further and to check whether further item deletion is needed (Hair et al., 2010). According to Dinev and Hu (2007), the composite reliability is more rigorous estimator of internal consistency than Cronbach's alpha. A scale is said to possess good reliability when the CR for each sub-scale be  $> .60$ , and the AVE for each dimension be  $> .50$  (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 2010).

###### *Result*

The results in Table 14 showed that the LOHAS scale has acceptable reliability. Nevertheless the AVEs of the 'physical fitness' (AVE=.49) and the 'intellectual stimulation' (AVE=.48) were slightly below the cut-off point, the items in these factors were decided to remain for the following reasons: 1) this is the 'first-time' exploratory study of the theoretical model-testing (Ping, 2009) 2) convergent validity of a construct is still adequate if CR is higher than .60 even if AVE is less than .50. (Fornell & Larcker, 1981) 3) it does not produce serious discriminant validity problems (Ping, 2009), and 4) the traits of the factors are more adequately reflected by the included items, enhancing the content and face validity (Brahma, 2009).

Table 14. Reliability assessment for LOHAS scale

<b>Environmentalism</b>		<b>Physical fitness</b>		<b>Stress control</b>		<b>Positivity</b>	
CR	AVE	CR	AVE	CR	AVE	CR	AVE
.91	.55	.83	.49	.81	.51	.83	.61
<b>Social interaction</b>		<b>Intellectual stimulation</b>		<b>Spirituality</b>		<b>Social consciousness</b>	
CR	AVE	CR	AVE	CR	AVE	CR	AVE
.77	.54	.64	.48	.90	.74	.75	.50

CR = composite reliability =  $(\sum \text{of standardized loadings})^2 / (\sum \text{of standardized loadings})^2 + \sum \text{of } \epsilon_j$ .

AVE = average variance extracted =  $\sum \text{of (standardized loadings)}^2 / \sum \text{of (standardized loadings)}^2 + \sum \text{of } \epsilon_j$ .

Overall, a global LOHAS scale developed in pooled data showed adequate reliability.



## **2) Validity**

### **(1) Construct validity**

In this stage, the construct validity of the LOHAS scale was examined. Peter (1981) defined the construct validity as “the degree to which a measure assesses the construct as it is purported to assess”. It is composed of convergent validity, discriminant validity, and nomological validity (Messick, 1992).

#### **A. Convergent validity**

##### *Data analysis*

Convergent validity is the degree to which a trait is well measured by its indicators (Campbell & Fiske, 1959). It is determined by whether observed variable loadings on a particular factor are high or not (Hair et al., 2010). If the items load statistically significantly on their respective latent variables with the loadings ranged between .50 and .90., convergent validity is met (Bagozzi & Yi, 1988; Hair et al., 2010). According to Hair et al. (2010), a factor loading above .50 is acceptable, and when it is equal to or above .70, it is regarded as good.

##### *Result*

Figure 5 shows that all items' loadings are greater than .50, except for item #4.3 (I attend a club or social activities on a regular basis) ( $\lambda=.41$ ). A cross-loading issue for that item was investigated again to locate the reason for a low loading, but it did not appear. Elimination of the item was tried, and it increased CR to .84. However, given that 1) the indicator measures an important aspect in the ‘social interaction’ factor, 2) the CR and AVE values of the factor that includes the item were already above the cut-off points, and 3) some psychometrists (e.g., Churchill, 1979) recommended to be more careful when discarding indicators, suggesting a lower cutoff of the loading value of .40., it was finally decided that the item remains as it was (Henseler, Ringle, & Sinkovics, 2009).

## ***B. Discriminant validity***

### *Data analysis*

Discriminant validity refers to the degree to which measures of different traits are unrelated (Campbell & Fiske, 1959). The discriminant validity is assessed by comparing the AVE and the correlation squared (Deshmukh & Joseph, 2017). If the AVE for each factor is higher than the squared correlation between the factor of interest and any other factor in the model (i.e., shared variance), the discriminant validity is established (Fornell & Larcker, 1981). This indicates that the average amount of variance in the observed variables that an underlying construct explains is greater than the amount of variance in another construct that the construct can account for (Farrell & Rudd, 2009).

### *Result*

The results in Table 15 show that the AVE of each factor is greater than the square of the correlation of the factor with any other factor in the model. It was found that the AVE of ‘intellectual stimulation’ and the squared correlation of that with ‘social consciousness’ are equivalent. This indicates that there is some correlation between the two constructs. The discriminant validity of the LOHAS scale is acceptable.

Table 15. Discriminant validity test

	Environ- mentalism	Physical fitness	Stress control	Positivity	Social interaction	Intellectual stimulation	Spirituality	Social consciousness
Environmenta- lism	<b>.55<sup>a</sup></b>							
Physical fitness	.16 <sup>b</sup>	<b>.49<sup>a</sup></b>						
Stress control	.08 <sup>b</sup>	.15 <sup>b</sup>	<b>.51<sup>a</sup></b>					
Positivity	.04 <sup>b</sup>	.13 <sup>b</sup>	.33 <sup>b</sup>	<b>.61<sup>a</sup></b>				
Social interaction	.02 <sup>b</sup>	.03 <sup>b</sup>	.10 <sup>b</sup>	.39 <sup>b</sup>	<b>.54<sup>a</sup></b>			
Intellectual stimulation	.14 <sup>b</sup>	.28 <sup>b</sup>	.19 <sup>b</sup>	.20 <sup>b</sup>	.11 <sup>b</sup>	<b>.48<sup>a</sup></b>		
Spirituality	.02 <sup>b</sup>	.08 <sup>b</sup>	.16 <sup>b</sup>	.24 <sup>b</sup>	.16 <sup>b</sup>	.04 <sup>b</sup>	<b>.74<sup>a</sup></b>	
Social consciousness	.36 <sup>b</sup>	.17 <sup>b</sup>	.15 <sup>b</sup>	.30 <sup>b</sup>	.30 <sup>b</sup>	.48 <sup>b</sup>	.11 <sup>b</sup>	<b>.50<sup>a</sup></b>

<sup>a</sup> AVE for each factor<sup>b</sup> Squared correlation (i.e., shared variance) between each pair of constructs

### *C. Nomological validity*

Nomological validity indicates the degree to which a construct shows an expected relationship with other related constructs as specified by a theory (Bagozzi, 1981; Churchill & Iacobucci, 2006; Gerbing & Anderson, 1988). By examining the behavior of the LOHAS construct in the nomological network, construct validity is assessed.

In assessing the nomological validity of the LOHAS scale, this study adopted one antecedent (future time orientation) and one consequence (status consumption) of the LOHAS lifestyle, which was identified from the literature. For the operationalization of ‘future time orientation’, the measure from Shipp, Edwards, and Lambert (2009) four-item scale was adopted while the five-item scale of status consumption from Eastman, Goldsmith, and Flynn (1999) was used to measure ‘status consumption’. This study relied on structural equation modeling (SEM), and the research model was estimated by AMOS 25.0 statistical package.

### *Data collection*

Nunnally and Bernstein (1994) argued that an additional sample is necessary to test the nomological validity. Two hundred ten respondents aged between 18 and 65 in the United States completed the survey through MTurk. Monetary compensation (\$.30/person) was given to those who completed the survey.

### *Theoretical background*

#### *Antecedents*

Time perspective is an important individual difference variable in the consumer behavior literature because an individual is influenced to behave by one’s view of future, past recollections, and present needs (Wade-Benzoni & Tost, 2009). Time orientation is particularly considered as an important dimension in sustainable behavior in that sustainable behavior entails a trade-off between present and future interests, needs, and activities (Wade-Benzoni & Tost, 2009); costs/sacrifice of the pro-environmental behavior occur in the present time, but its benefits are rewarded in future (Arnocky, Milfont, & Nicol, 2014). In the previous research, future-oriented perspective and selfless orientation respectively predicted pro-environmental behavior (Milfont & Gouveia, 2006). Those who take the future view tend to consider more

about the environment, and they are more prone to take action to address environmental problems than present-oriented individuals (Milfont, Wilson, & Diniz, 2012).

**Hypothesis1: Future time perspective will positively influence the environmentalism.**

Beyond the environmental issues, there is research that addressed long-term perspective in relation to moral and social issues such as discrimination, integrity, and human right (Christie, Kwon, Stoeberl, & Baumhart, 2003). In the research that investigated how specific time orientation influences the formation of personal ethical values, Nevins, Bearden, and Money (2007) found that marketing practitioner with long term perspective on tradition and planning is more likely to have honesty and fairness toward business law, customer treatment as far as the one possesses stronger beliefs towards conservatism and work ethic. Furthermore, research exploring the role of the cultural dimensions in the prediction of ethical values revealed that the countries with a long-term orientation have high levels of ethical values (Moon & Franke, 2000; Tsui & Windsr, 2001). For example, Japanese consumers who practice long-term planning placed a high value on the conservative and social-focused values in the evaluation of companies' brands (Erffmeyer, Keillor, & LeClair, 1999). Chinese business managers from state-owned enterprises who value long-term perspective were prone to have high standards of business ethics (Ip, 2003). Cross-Cultural research showed that the business managers from America with long-term orientation have a higher awareness of the role of business ethics than those from Korea and India with short term perspective (Christie, Kwon, Stoeberl, & Baumhart, 2003).

**Hypothesis2: Future time perspective will positively influence social consciousness.**

Future time perspective has also been related to personal well-being in the sense that future focus leads individuals to invest in the activities that help achieve positive future outcomes and avoid undesired future consequences (Trommsdorff, 1983). Sensitivity to an impact of the present actions and decisions on the future consequences enables individuals to plan for the future and prepare for the proactive responses (Desmyter & De Raedt, 2012). For example, in the health-conscious behavior context, women with future time orientation are more prone to have

regular breast examination (Guarino, DePascalis, DiChiacchio, & Zimbardo, 1999). Also, individuals high in future time perspective eat healthy foods more often (Boyd & Zimbardo, 2006), practice safe sex (Rothspan & Read, 1996), and they are less inclined to use alcohol and substance (Alvos, Gregson, & Ross, 1993; Keough, Zimbardo, & Boyd, 1999).

### **Hypothesis3: Future time perspective will positively influence physical fitness.**

A focus on the future has been revealed to be intercorrelated with mental health. In the study of time perspective and mental state, Sirois (2014a) explained a negative association between future time perspective and negative mental state (e.g., procrastination) as a function of stress. Those who avoid the task and wait until the last minute tend to have difficulty separating themselves from negative emotions and tend to take critical/judgmental view toward their flaws (Sirois, 2014b; Sirois & Tosti, 2012). This negative self-evaluation leads to a preoccupation with personal inadequacies, which increase their stress, and it directs their focus away from distal but towards immediate concerns as a way to find present pleasurable alternatives which reduce their stress. On the other hand, positive emotional states serve to broaden one's focus and the scopes of attention, and it, in turn, encourages them to take a more future orientated perspective (Fredrickson, 1998). On the contrary to the negative association with stress, future time orientation has been revealed to have a positive relationship with stress coping. Zimbardo and Boyd (2015) found that pronounced future-oriented individuals reported a presence of stress, a higher level of stress, and pressured lifestyle, but they were more involved in active coping activities to deal with stress (Holman & Zimbardo, 1999).

### **Hypothesis4: Future time perspective will positively influence stress control.**

Several studies have examined the relation of future time perspective to optimism. In a study of childhood cancer survivors, Mann, Kato, Figdor, & Zimbardo (1999) assigned subjects to write about selected events in the past, present, or future. A positive correlation between future time orientation and optimism was found such that writing about the future leads to a significant increase in optimism. Pessimists particularly benefited from future writing; their optimism significantly increased relative to the increase in the optimism of the optimists. Moreover, Rush

and Grouzet (2012) studied the relationship between temporal perspective and daily well-being and found a positive impact of the future time perspective on positive affective state when participants rated their future thoughts were proximal and pleasant.

**Hypothesis5: Future time perspective will positively influence positivity.**

Future time perspective relationships in other life domains such as intellectual achievement, socialization, and spirituality have been studied with an emphasis on the cognitive aspect of future time perspective. The cognitive aspect of future time perspective has to do with the thoughts that people have about future outcomes and the perceived instrumentality of current behavior/decision makings for valued future goals (Andre, Vianen, Peetsma, & Oort, 2018). De Volder and Lens (1982) found that the students who highly value the goals in the distant future showed higher academic performance and higher study persistency. The high achieving students viewed studying hard as a means of achieving goals (e.g., career, social status, possessions) in the distant future. Furthermore, research viewing future time orientation as a cognitive-motivational variable has consistently revealed that perception about the instrumentality of present acts and future time orientation impacts educational motivation and interest (Husman & Lens, 1999). Van Calster, Lense, and Nuttin (1987) identified that students are significantly more motivated when they perceive their education as important for their future (high instrumentality), but the effect of perceived instrumentality only works when they have positive affect toward their future. Moreas and Lens (1991) found that students with extended future time orientation tend to be more motivated for their academic tasks than their peers with short future time orientation. This relationship was found to be stronger for distant goals. Academic tasks are evaluated more critical for those with extended future time orientation because they perceive that the tasks will lead to the achievement of future goals. Therefore, even when they are not interested in the tasks for its own sake, the utility value of the tasks increases and they can be extrinsically motivated.

**Hypothesis6: Future time perspective will positively influence intellectual achievement.**

A stream of research identified the relevance of future time orientation to explain and interpret the variations in social satisfaction and personal networks. For example, in a study with German adults aged between 20 to 90, Lang and Carstensen (2002) found the positive associations between future time orientation and prioritized social goals (i.e., social acceptance and autonomy) and preference for a social partner (i.e., friend/acquaintance, knowledgeable partner). Individuals who perceive the future as expansive in time are more likely to put social acceptance as an important social goal, and they reported more extensive personal networks and a greater proportion of friends. Also, they found that the impact of future time orientation on the perceived quality of personal network depends on the content of the prioritized social goal. When individuals select social goals in congruence with perceptions of remaining time in future (e.g., emotional regulation goals with the perception of limited time in future, social acceptance goals with recognition of open-ended future time), they reported greater social satisfaction.

**Hypothesis7: Future time perspective will positively influence socialization.**

Despite a lack of well-defined theoretical specification, limited literature revealed that future time orientation is relevant to spiritual well-being. In the research on the review of the relation of religiousness and spirituality with externalizing psychopathology (EP) in adolescence, Holmes and Kim-Spoon (2016) found that higher spirituality is associated with less EP by way of future time orientation. Specifically, high religious/spiritual adolescents were more prone to think about their future (e.g., afterlife beliefs) and this prevented decline in the value of future reward as it goes further from the present, which may ultimately lead to self-control and discourage unhealthy behaviors.

**Hypothesis8: Future time perspective will positively influence spirituality.**

*Consequences*

Individuals make consumption decisions under the impact of social influence (Erciş, Ünal, & Bilgili, 2010). People rely on interpersonal sources of information before they purchase



in order to reduce the risk of making wrong decisions (i.e., informative approach) (Bearden, Netemeyer, & Teel, 1989; Bearden & Rose, 1990). They are also influenced by others when seeking approval for their purchases, or when buying what others buy in order to get a sense of belonging as a member of a social group (i.e., normative approach) (Bearden et al., 1989). The impact of social influence increases when consumers are more sensitive to the opinions of others (e.g., Clark, Zboja, & Goldsmith, 2007).

‘Consumer independence’ is a term to describe a consumer tendency to ignore or be unresponsive to social influences regarding product/brand choices by giving high value on personal tastes and preferences instead of norms of consumer reference groups (Clark, 2006). Independent consumers were found to be less likely to have social motivation for consumption and be less susceptible to normative social influence (Clark, 2006). Because status consumption involves social dimension pertaining to consuming particular goods and brands, consumers who are sensitive to how others view them and consider the opinions of others should be more likely to show or improve their status through the purchase of products that confer and symbolize social standing (Dittmar, 1992).

### **Hypothesis 9: Social interaction will positively influence status consumption.**

Negative thoughts and feelings such as self-doubt, self-threat, negative evaluation are related to the desire for acquisition of material objects (Chang & Arkin, 2002; Christopher & Schlenker, 2004; Sivanathan & Pettit, 2010). When the integrity of the self is threatened, individuals attempt to protect the self through an alternate source of self-integrity to recover their self-worth (e.g., Sherman & Cohen, 2006; Sivanathan, Molden, Galinsky, & Ku, 2008). Given the self and possessions are closely related such that the possession is one defining factor of the self and a symbol of identity, consuming high-status goods may serve as indirect psychological resources needed to affirm self (Belk, 1988; Fromm, 2014; Karabati & Cemalcilar, 2010). On the contrary, positive emotions or beliefs (e.g., optimism) are inversely related to the consumption of status goods. Individuals with positive emotions can appraise the strength and adequacy of one’s inner resources to endure negative events/information (Schwarz & Bohner, 1996; Schwarzer, 1994).

### **Hypothesis 10: Positive emotions will negatively influence on status consumption.**

Values are the preconditions for social movement (Bean & Papadakis, 1994). Researchers have demonstrated the motivational importance of postmaterialist values on socially conscious behavior (e.g., Pepper, Jackson, & Uzzell, 2009). For example, universalism, benevolence, and self-transcendence are more likely to be involved in solving long-term social problems such as environmental protection, human right, and inter/intragenerational equity (e.g., Crowe & Simon, 2000; Pepper, Jackson, & Uzzell, 2009; Shaw, Grehan, Shiu, Hassan, & Thomson, 2005). Conversely, values such as materialism focusing on short-term narrow individual interests are more concerned with the attainment of personal goals (Mueller & Wornhoff, 1990). The collective orientation of postmaterialistic values conflict with individual-oriented values of materialism (Burroughs & Rindfleisch, 2002). The distinction between postmaterialistic and materialistic values can also be explained by the scarcity of need fulfillment (Bean & Papadakis, 1994). Drawing upon Maslow (1954)'s 'hierarchy of needs', once basic material needs have been met including food, shelter, and economic security, which are located at the lower level of hierarchy, people seek a higher level of needs such as intellectual, social, and self-actualization needs (Bean & Papadakis, 1994). As such, materialism and postmaterialism are viewed as mutually exclusive on the value circumplex (Pepper, Jackson, & Uzzell, 2009). The value circumplex model presents a structural relation of universal values (Schwartz, Melech, Lehmann, Burgess, Harris, & Owens, 2001). The values that share similar nature and those that guide a personal life in a similar way lie next to each other in the circle, while the values that contrast each other lie opposite one another (Schwartz, 1994). Kasser (2003) found that materialism was inversely associated with concern for the welfare of others but positively related to selfishness and narcissism. Based on the evidence from previous research, socially conscious behavior is expected to have a negative relationship with status consumption considering that socially conscious behavior is based on public and community-oriented values, which is contradictory to the status consumption which is based on personal and private value (Goldsmith & Clark, 2012; Eastman, Goldsmith, & Flynn, 1999).

### **Hypothesis 11: Social consciousness will negatively influence status consumption.**

Many researchers have argued that following a spiritual life is incompatible with materialistic pursuits. Stillman, Fincham, Vohs, Lambert, and Phillips (2012) observed that people with a higher level of spirituality reported lower desire to consume money in a lavish and flashy way. This relationship was mediated by materialism such that a higher level of spirituality reduced the value that individual placed on material objects, and it, in turn, decreased one's desire to spend a considerable amount of money on material goods. In line with this, in the research on spirituality as a motivational aspect of human behavior, Piedmont, Wilkins, and Hollowitz (2013) revealed that one's spiritual and religious traits contrast with materialism and consumerism (i.e., possession, acquisition of wealth) but align with non-material values including relationship with others, compassion, and altruism. The negative association between spirituality and materialism was seen as a conflict between intrinsic (i.e., spirituality) and extrinsic (i.e., materialism) motivation/goal pursue.

### **Hypothesis 12: Spirituality will negatively influence status consumption.**

When experiencing stressful events, people take consumption as a means of coping with stress (Celuch & Showers, 1991). Homeostatic drive reduction theory explains that stress damages balanced psychological state, and then coping responses work to find a way to control emotion and recover psychological equilibrium. Immediate behavioral responses that relieve negative emotions and restore psychological stability provide individuals with a sense of control over the stressful situation. Those behaviors are positively reinforced as a way of overcoming stressful situation (Hirschman, 1992). Some compulsive consumption behaviors (e.g., addictive shopping, overspending, impulsive buying) are considered as coping responses used to handle stressful life events (Hirschman, 1992; O'Guinn & Faber, 1989).

Besides, stress influences the development of favorable attitude toward material possessions such that possessing materials provides temporal hedonic feelings which direct one's mind away from the stressful situation (Lazarus & Folkman, 1984; Rindfleisch, Burroughs, & Denton, 1997). To illustrate, the youths who experienced acute life course stress such as parental divorce were reported more likely to have lower emotional security and self-esteem. Their

increased vulnerability to stressful events made them rely more on the positive aspect of material possessions (Belk, 1988; Elder, 1998; Hill, Yeung, & Duncan, 2001). In sum, from the review of the previous research, it can be postulated that those who have adequate approaches to stress control are less likely to place a weigh on addictive consumption or the consumption behaviors that demonstrate one's material affluence. This is because they may have other resources that can be used to relieve negative psychological feelings.

**Hypothesis 13: Stress control will negatively influence status consumption.**

Research on the impact of intellectual traits on consumption patterns has been scarce. To postulate the relationship between intellectual engagements in LOHAS and status consumption, it was needed to draw upon intellectual attribute in Voluntary Simplifiers (VS), which is considered as a lifestyle similar to LOHAS in terms of its concern for both personal and social well-being (e.g., Craig-Lees & Hill, 2002a). Voluntary simplifiers are those who consciously decide to live in a way that restrains material possessions and rather focuses on the spiritual and intellectual aspect of life (Shama, 1985; Zavestoski, 2002). They give up high levels of income and invest more time on leisure, family, or creative and intellectual works (Craig-Lees & Hill, 2002b; Brooks, 2003). Pursue of personal growth through intellectual and spiritual engagement is their prominent value, and this conflicts with materialism emphasizing wealth, possession, ostentation, and status (e.g., Stillman et al., 2012). Empirical evidence shows that people who place a high value on materialism have less work and intellectual motivation, consume more products, and show lower personal well-being level (Kasser, 2016).

**Hypothesis 14: Intellectual stimulation will negatively influence status consumption.**

Evidence has suggested that physical well-being is negatively associated with materialistic values. People who are materialistic take priority on the satisfaction with material possession for personal success and often look down other non-material values related to caring for one's physical and psychological well-being (Kashdan & Breen, 2007). Indeed, materialistic individuals are more likely to engage in risky health behaviors such as smoking or drinking alcohol (Dittmar, Bond, Hurst, & Kasser, 2014). In the study on the relationship between

materialistic life goals and health-compromising behaviors by Williams, Hedberg, Cox, and Deci (2000), adolescents who reported high aspirations for extrinsic life goals (e.g., wealth, fame, and image) relative to intrinsic goals (e.g., relationship, growth, and community feeling) were more likely to engage in substance use and smoking. In a similar vein, Kasser and Ahuvia (2002) found that the students who believe materialistic goals (i.e., money, popularity, and image) are essential in their life reported higher physical symptoms, including headaches, stomachache, chest pain, faintness, shortness of breath, or others (Emmons, 1991).

**Hypothesis15: Physical health will negatively influence status consumption.**

Pro-environmentalism and pursuit of materialistic goals are fundamentally opposite (Hurst, Dittmar, Bond, & Kasser, 2013). The detriment of the planet's resources is attributable to global economic growth and capitalism (Hamilton, 2011; Jackson, 2009; Speth, 2008). Citizens who place high values on wealth and social standing in free-market-oriented nations are reported to be more likely to have high levels of CO<sub>2</sub> emissions (Jackson, 2009; Kasser, 2011; Schwartz, 2007). A possible reason for the inverse association of the environmentalism with materialism is value conflict (Hurst et al., 2013). In the value circumplex model, a value of universalism, which is associated with valuing the environmental protection, social justice, and equality, is located on the opposite side of materialism, which relates to self-interested values, indicating that the two values are incompatible (Burroughs & Rindfleish, 2002). This implies that it is difficult for individuals to support both values simultaneously. Maio, Pakizeh, Cheung, and Rees (2009) provided more in-depth insight into how materialism has a double negative impact on environmental concerns. Their experiment revealed that when the materialistic value is primed, it influences the increase in the importance of materialism and the decrease in the importance of its opposite value of universalism, which is positively related to pro-environmental behavior. Empirical evidence has corroborated this argument. For example, Andersson and Nässén (2016) found that individuals with high materialism care less about the environment and caused more greenhouse gas (GHG) emissions than non-materialists. Banerjee and McKeage (1994) also found that people who consider material possession as success seem unconcerned with environmental consequences of consumption.

## **Hypothesis16: Environmentalism will negatively influence status consumption.**

### *Results*

An estimated structural model provided indecisive (i.e., moderate or inadequate) fit to the data (CMIN/DF = 2.56;  $p < 0.001$ ; CFI = .81; RMSEA = .09; TLI = .78). To be specific, the model fit indices were mixed; CMIN/DF estimate (2.56) was acceptable given that cut-offs between 2 to 5 were suggested (e.g., Byrne, 2012; Marsh & Hocevar, 1985), and RMSEA value was mediocre (.09), considering that RMSEA cut-off between 0.08 to 0.10 was recommended (MacCallum, Browne, & Sugawara, 1996). However, CFI (.81) and TLI (.78) estimates did not meet common standards (CFI; cutoff  $\geq 0.9$ , TLI; cutoff  $\geq 0.9$ ) (McDonald & Ho, 2002). Marsh, Hau, and Grayson (in press) criticized that the criteria for the conventional goodness of fit are too restrictive in light of their experience that it is not easily achievable to get an acceptable fit for most goodness of fit indexes even for good multifactor scales when analyses are done at the item level and there are various factors (e.g., 5-10).

With regards to the relations among the variables in the nomological network, it was confirmed that future time perspective might be a significant predictor for all subdimensions of the LOHAS lifestyle. That is, future focus seemed to be a driver of physical fitness ( $\beta=.93$ ,  $p < .001$ ), stress control ( $\beta=.92$ ,  $p < .001$ ), positivity ( $\beta=.92$ ,  $p < .001$ ), intellectual stimulation ( $\beta=.61$ ,  $p < .001$ ), spirituality ( $\beta=.63$ ,  $p < .001$ ), environmentalism ( $\beta=.76$ ,  $p < .001$ ), social interaction ( $\beta=.86$ ,  $p < .001$ ), and social consciousness ( $\beta=.93$ ,  $p < .001$ ).

As for the consequences, the model showed that spirituality ( $\beta=.35$ ,  $p < .001$ ) and social interaction ( $\beta=.32$ ,  $p < .05$ ) might have a positive effect on status consumption. On the other hand, positivity ( $\beta= -.11$ ,  $p < .001$ ) seemed to have a negative effect on status consumption, in accordance with H10. The effects of physical fitness ( $\beta=.36$ ,  $p = .12$ ), stress control ( $\beta=.29$ ,  $p = .14$ ), intellectual stimulation ( $\beta= -.05$ ,  $p = .23$ ), environmentalism ( $\beta=.43$ ,  $p = \text{N/A}$ ), social consciousness ( $\beta=.32$ ,  $p = .03$ ) on status consumption were non-significant.

A positive relation of spirituality to status consumption, which is contradictory to the expected result, could be explained by the non-religious nature of the spiritual dimension in LOHAS. Compared to the religious form of spirituality (e.g., religious practices-prayer, relationship with deity), non-religious form (e.g., sense of connectedness with whole humanity, being a part of the universe) has to do with a positive association with material consumption. For

example, Piedmont, Wilkins, and Hollowitz (2013) reported that spiritual transcendence (i.e., feeling bounds with others) increased the level of materialism. Żemojtel-Piotrowska, Piotrowski, and Klimaszewska (2010) also found that the expression of spiritual transcendence (i.e., paintings illustrating religious/spiritual content) results in spending on status goods. Moreover, Piedmont, Wilkins, and Hollowitz (2013) found that all religious-oriented dimensions of the assessment of spirituality and religious sentiments (ASPIRES) scale (i.e., prayer fulfillment, universality, and religious involvement) were negatively related to consumerism and materialism whereas connectedness, which is non-religious dimension, was positively associated with material possession, indicating people who have a sense of involvement in community and concern for health of their community showed interests in acquiring wealth. Figure 6 shows the nomological network of the LOHAS construct, and table 16 provides the statistics for its paths.

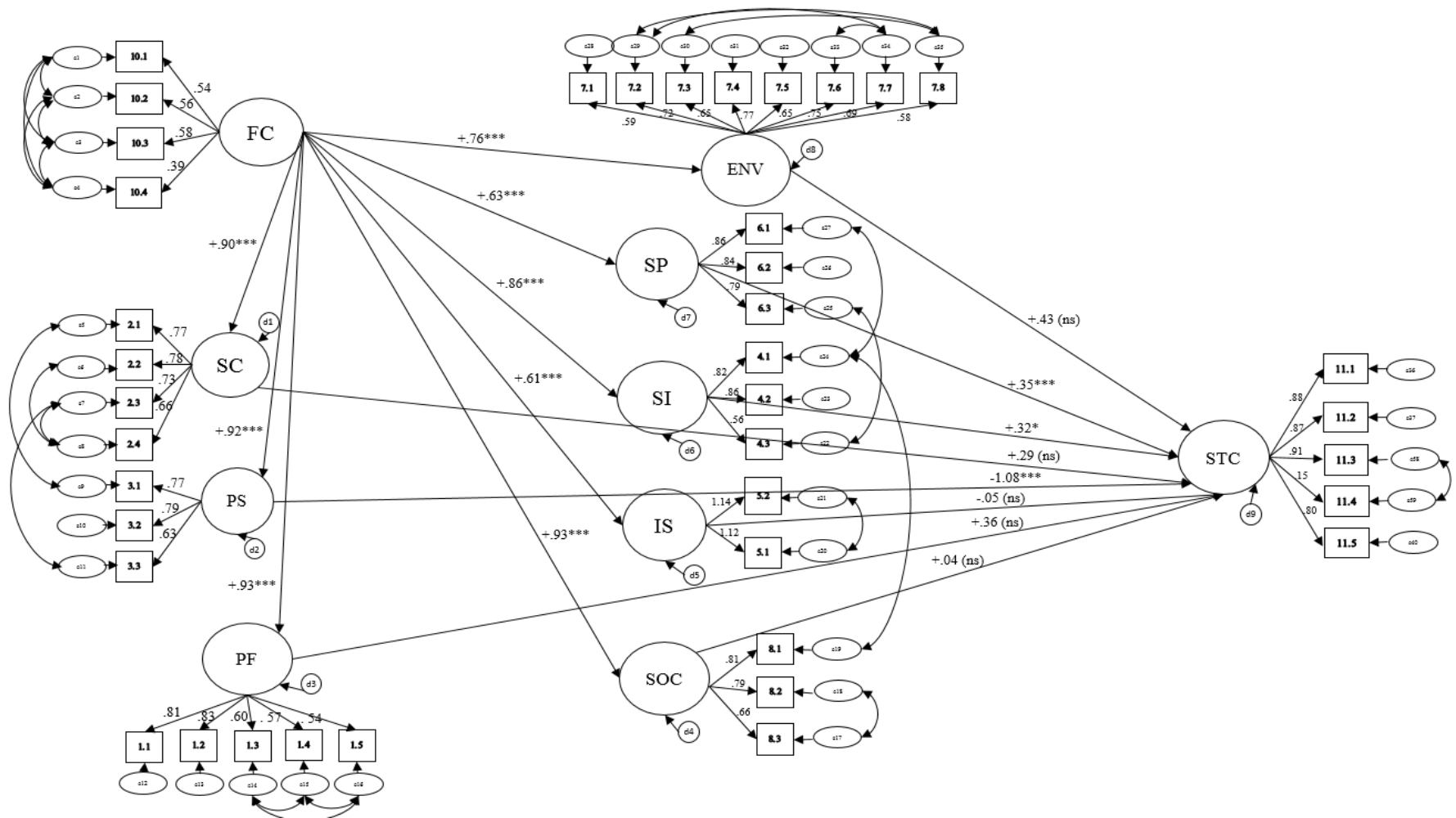


Figure 6. Test of the nomological validity of the scale.

Notes: all path coefficients are standardized estimates.

\*\*\* $p < 0.001$ .

\*\* $p < 0.01$ .

\* $p < 0.05$



Table 16. Statistics for the paths of nomological validity test

Path	$\beta$	S.E	t-Value
FTP (Future time perspective) $\rightarrow$ PF	0.93	0.28	4.78***
FTP (Future time perspective) $\rightarrow$ SOC	0.93	0.41	5.49***
FTP (Future time perspective) $\rightarrow$ PS	0.92	0.29	5.07***
FTP (Future time perspective) $\rightarrow$ IS	0.61	0.38	5.36***
FTP (Future time perspective) $\rightarrow$ SP	0.63	0.34	4.97***
FTP (Future time perspective) $\rightarrow$ EN	0.76	0.23	4.86***
FTP (Future time perspective) $\rightarrow$ SI	0.86	0.42	5.40***
FTP (Future time perspective) $\rightarrow$ SC	0.90	0.35	5.33***
PF $\rightarrow$ STC (Status consumption)	0.36	0.54	1.54
SC $\rightarrow$ STC (Status consumption)	0.29	0.32	1.47
PS $\rightarrow$ STC (Status consumption)	-1.08	0.59	-3.83***
IS $\rightarrow$ STC (Status consumption)	-0.05	0.05	-1.19
SP $\rightarrow$ STC (Status consumption)	0.35	0.14	3.19***
EN $\rightarrow$ STC (Status consumption)	0.43	- N/A	-N/A
SI $\rightarrow$ STC	0.32	0.18	2.17*
SOC $\rightarrow$ STC	0.04	0.39	0.12

Notes: all path coefficients are standardized estimates.

\*\*\* $p < 0.001$ .

\*\* $p < 0.01$ .

\* $p < 0.05$ .

To recapitulate, the LOHAS scale can be said to have dubious nomological validity. The fact that some indices satisfied good fit criteria and others didn't prove the scale's nomological validity inconclusive. It will need to carefully search a cause of failure for the scale to meet good fit to all indices. Also, it may need to use other variables that are theoretically relevant to the LOHAS construct in testing the nomological validity.

## *(2) Criterion validity*

Criterion validity is the degree to which a scale is associated with practical behaviors or actual life outcomes (Eastman, Goldsmith, & Flynn, 1999). Theoretical base for that association is not an issue, but it is more an empirical concern (DeVellis, 2017). Criterion validity often refers to predictive validity because it is merely concerned with a prediction of a relationship between a measure (a predictor) and a variable of interest in practice (a criterion). Understanding a process between those two variables is not a concern. (DeVellis, 2017; Ghiselli, Campbell, & Zedeck, 1981).

### *A. Scale predictive validity*

Scale predictive validity was examined first to test if the LOHAS scale is valid to predict the LOHAS group.

#### *Data Collection*

Total of 855 pooled data was used for scale predictive validity test.

#### *Data Analysis*

Discriminant analysis (DA) was done. For the predicted outcome variable (i.e., high vs. low LOHAS group), the sample was split into two groups using a median split, which is high and low LOHAS groups. Specifically, for each person, the LOHAS scale score was calculated using the final LOHAS scale, and the scale score ranged from 31 to 155 (i.e., minimum value:  $1=\text{strongly disagree} \times 31 \text{ items} = 31$ , maximum value:  $5=\text{strongly agree} \times 31 = 155$ ). A subject with the score below 110 was assigned to the low LOHAS group and above 110 was labeled high LOHAS group. Then, the eight factors' factor scores calculated from EFA were used as independent variables. Stepwise discriminant analysis was run on all the factors to identify what factors differentiate the most two levels of the LOHAS group.

H<sub>0</sub>: The means of low and high LOHAS groups (group centroids) on the discriminant function are equal.

## Results

### a. Discriminant function quality

An evaluation of the quality of the discriminant function is necessary before discussing the importance of the factors identified by the DA. The relevant statistics are presented in Table 17.

Table 17. Characteristics of the discriminant function

	Eigenvalue	Canonical Correlation	Wilks' Lambda	Chi-square	DF	Significance
Stepwise model	1.708	.794	.369	386.56	8	.000

Eigenvalue shows a discriminating ability of the function. A larger eigenvalue indicates that more variance in the dependent variable is explained by the function (George & Mallery, 1999). The eigenvalue of 1.708 in this model supports the high discriminant ability of the function. For the canonical correlation, it represents the correlation between the discriminant scores and the dependent variable (Bian, 2012). A higher correlation value indicates a better function to discriminate. The correlation value of .794 ( $> .30$ ) implies an acceptable level of high correlation (Lambert & Durand, 1975). The square of the canonical correlation coefficient means the percentage of variance explained in the dependent variable (Sherry & Henson, 2005). In this study, 63% (i.e.,  $(.794)^2 * 100 = .630$ ) of the variation in the grouping variable is explained by the model.

Wilk's lambda shows the significance of the discriminant function (Tatsuoka, 1970). The more the Wilk's lambda value is close to 1, the more the group means are likely to be equal. The smaller value represents that the group means differ (Engels & Theusinger, 1998). The value of .369 ( $< .50$ ) is acceptable to say that between group variability is larger than the within-group variability (Brahim et al., 2010). The results indicate that the discriminant function ( $\chi^2(8) = 386.56, p < .001$ ) is largely significant.

*b. Factor identified by the discriminant function*

It was found that all the eight factors extracted from factor analysis are retained as IVs from the stepwise discriminant procedure. Structure coefficients (i.e., discriminant loadings) represent the correlations of each variable with the discriminant function (Poulsen & French, 2008). They are similar to factor loadings in factor analysis when interpreted (Banerjee & Pawar, 2013). In general, .30 is regarded as a cut-off to determine important and less important variables (Tabachnick, Fidell, & Ullman, 2007).

As shown in Table 18, ‘environmentalism (with a coefficient of .41)’ was most influential in discriminating the low from high LOHAS groups. ‘Stress control’ was the second most important factor (with a coefficient of .27). ‘Spirituality (with a coefficient of .23)’, ‘physical fitness (with a coefficient of .22)’, ‘positivity (with a coefficient of .18)’, ‘social consciousness (with a coefficient of .18)’, and ‘social interaction (with a coefficient of .13).’ were followed by in sequence. Intellectual stimulation showed little influence.

All variables had positive signs, and it indicated a positive relationship between the predictors and the discriminate function. For example, the more one is environmentally oriented, the more one is likely to be a LOHASian.

Table 18. Best factors for the discrimination of low and high LOHAS group

Factors	Coefficients (Loadings)	Means Responses by Group	
		Low LOHAS (n= 206)	High LOHAS (n=206)
Environmentalism	.41	-.49	.45
Stress Control	.27	-.34	.31
Spirituality	.23	-.30	.27
Physical Fitness	.22	-.29	.27
Positivity	.18	-.23	.21
Social Consciousness	.18	-.23	.21
Social Interaction	.13	-.17	.16
Intellectual Stimulation	.09	-.12	.11
		Group Means	
		-1.37	1.25

c. Classification analysis

Table 19 shows how well the discriminant function works. The rows represent the observed cases for each group in the dependent variable, and the columns correspond to the predicted cases. As shown, among the 188 cases of the low LOHAS group, 176 are predicted correctly, and 12 are mispredicted by the model. Likewise, out of the 206 cases of high LOHAS group, 200 are assigned correctly, but six are assigned incorrectly. Overall, 95.4% of the cases are correctly classified by the discriminant model.

Table 19. Low versus high LOHAS, Predictive validity (Classification Analysis)

Actual	Predicted		Total number of subjects
	Low LOHAS	High LOHAS	
Low LOHAS	176 (93.6%)	12 (6.4%)	188
High LOHAS	6 (2.9%)	200 (97.1%)	206

a. 95.4% of original grouped cases correctly classified.

**B. Behavioral predictive validity**

The purpose of this phase is to investigate whether the LOHAS scale is related to actual behavior. To see if the LOHAS consumers would reflect the belief in health and sustainability to their consumption choices, a choice decision between regular products versus healthy/sustainable products with the premium price was employed as a criterion.

*Procedure*

The setting for the choice task was as follow. There were two sets of the choice option: 1) a product with certified label (i.e., NON-GMO project verified, USDA organic, fair trade, energy star, or USDA certified bio-based product) was presented as a healthy/sustainable product with high price, and 2) a product without a certified label was presented as a regular product with a baseline price.

Participants were notified that the products under consideration only differed in terms of the price and certification, and they were identical on all other attributes (Elrod & Chrzan, 2003). The levels of price for all products were chosen based on the actual prices as assessed during a store check in October 2017 in supercenter in Indiana, US. To avoid any confusion, an identical picture of the product was presented on each choice option for all products.

Five types of products (i.e., apple, orange juice, ground coffee, dish liquid, light bulb) were suggested, and the product categories included groceries (i.e., apple, orange juice, ground coffee), household goods (i.e., dish liquid), and electric products (i.e., light bulb). These products were chosen because lay people more easily understand the sustainable production background of the daily products than high involvement products (Davies, Lee, & Ahonkhai, 2012; Young, Hwang, McDonald, & Oates, 2010). They seek transparency about sustainability-related issues in daily products (Meise, Rudolph, Kenning, Phillips, 2014).

#### *Data collection*

Additional two hundred ten samples (i.e., US general population) were gathered using MTurk to conduct a choice experiment.

#### *Data Analysis*

Cross-tabulation, chi-square tests, and frequency distribution were used to analyze data.

**Hypothesis:**  $H_0$ : There is no relationship between LOHAS levels and product choice decision.

#### *Results*

Table 20 shows the respondents' choice decisions for granny smith apple. It was found in the study that the high LOHAS group (90%) is more likely to choose the apple with certification label (i.e., USDA organic), showing a willingness to pay price premium than the low LOHAS group (75%). Since P-value was found .005 at 5% level of significance,  $H_0$  was rejected, and a

conclusion was drawn that there is a relationship between levels of LOHAS and choice decision for granny smith apple.

Table 20. Granny smith apples

		Choice options		Total	Chi-Square
		USDA organic with high price	No certification with baseline price		
Group	Low LOHAS	78	26	104	Value-7.893 <sup>s</sup> (Sig .005)
		75%	25%	100%	
	High LOHAS	90	10	100	
		90%	10%	100%	
Total		168	36	204	
		82.4%	17.6%	100%	

S= significant

For an orange juice, it was found that the high LOHAS group (75%) is more likely to choose the orange juice with certification label (i.e., Non-GMO verified), possessing a willingness to pay price premium than the low LOHAS group (59%). Since P-value was found .013 at 5% level of significance,  $H_0$  was rejected, and a conclusion was drawn that there is a relationship between levels of LOHAS and choice decision for orange juice. Table 21 shows the result.

Table 21. Orange juice

		Choice options		Total	Chi-Square
		NON-GMO verified with high price	No certification with baseline price		
Group	Low LOHAS	61	43	104	Value-6.130 <sup>s</sup> (Sig .013)
		59%	41%	100%	
	High LOHAS	75	25	100	
		75%	25%	100%	
Total		136	68	204	
		67%	33%	100%	

S= significant

For a ground coffee, it was found that the high LOHAS group (76%) is more likely to choose the ground coffee with a certification label (i.e., fair trade), showing a willingness to pay price premium than the low LOHAS group (58%). Since P-value was found .006 at 5% level of significance,  $H_0$  was rejected, and a conclusion was drawn that there is a relationship between levels of LOHAS and choice decision for ground coffee. Table 22 summarizes the result.

Table 22. Ground coffee

		Choice options		Total	Chi-Square
		Fair trade with high price	No certification with baseline price		
Group	Low LOHAS	60	44	104	Value-7.689 <sup>s</sup> (Sig .006)
		58%	42%	100%	
	High LOHAS	76	24	100	
		76%	24%	100%	
Total		136	68	204	
		67%	33%	100%	

S= significant

Regarding the LED light bulb, it was found in this study that there is no difference in choice decisions between low and high LOHAS groups. It seemed that people in high LOHAS group tend slightly more to choose the light bulb with Energy star with premium price than low LOHAS group, but P-value was found .614 at 5% level of significance and  $H_0$  could not be rejected. A conclusion was that there is no relationship between levels of LOHAS and choice decision for an LED light bulb. Table 23 shows the result.



Table 23. LED light bulb

		Choice options		Total	Chi-Square
		Energy star with high price	No certification with baseline price		
Group	Low LOHAS	78	26	104	Value-0.255 (Sig .614)
		75%	25%	100%	
	High LOHAS	78	22	100	
		78%	22%	100%	
Total		156	48	204	
		76%	24%	100%	

Similar to the LED light bulb case, it was found in this study that there is no difference in choice decisions for dish liquid between low and high LOHAS groups. While it seemed that people in high LOHAS group tend slightly more to choose the USDA certified bio-based dish liquid with premium price than the people in low LOHAS group, P-value was found .134 at 5% level of significance and  $H_0$  could not be rejected. A conclusion was that there is no relationship between levels of LOHAS and choice decision of dish liquid. Table 24 shows the result.

Table 24. Dish liquid

		Choice options		Total	Chi-Square
		USDA certified bio- based product with high price	No certification with baseline price		
Group	Low LOHAS	68	36	104	Value-2.249 (Sig .134)
		65%	35%	100%	
	High LOHAS	75	25	100	
		75%	25%	100%	
Total		143	61	204	
		70%	30%	100%	

To summarize, it was identified that the LOHAS scale has a scale predictive validity. This means that the scale is valid to effectively predict the LOHAS group from the general

population. All the sub-domains of LOHAS, including environmentalism, stress control, spirituality, physical fitness, positivity, social consciousness, social interaction, intellectual stimulation, were found to be significant predictors for the discrimination between the LOHAS group and general population. Also, the LOHAS scale has a behavioral predictive validity to some degree. Those who possess the LOHAS spirit were found to purchase eco- and socially friendly products, especially in the food category, not in electronic and household goods categories.

### ***3) Test of the hierarchical factor structure***

The current study surmises LOHAS as a third-order factor. Using a reflective model, the two second-order constructs of health and sustainability are treated as an imperfect reflection of the underlying latent construct (LOHAS). The eight first-order dimensions are also viewed as behavioral manifestations of each second-order factor (health and sustainability). This means that the change in the third-order focal construct of LOHAS produces a change in all of its dimensions and items. Direct manipulation of a specific indicator will not affect the latent variable (LOHAS). This model highlights a casual flow from higher order construct (LOHAS) to the indicators (Saleem, Eagle, & Low, 2018; Tang et al., 2018).

To test the third-order factor structure, this study adopted the third order confirmatory factor analysis (CFA) using AMOS. Figure 7 shows this.

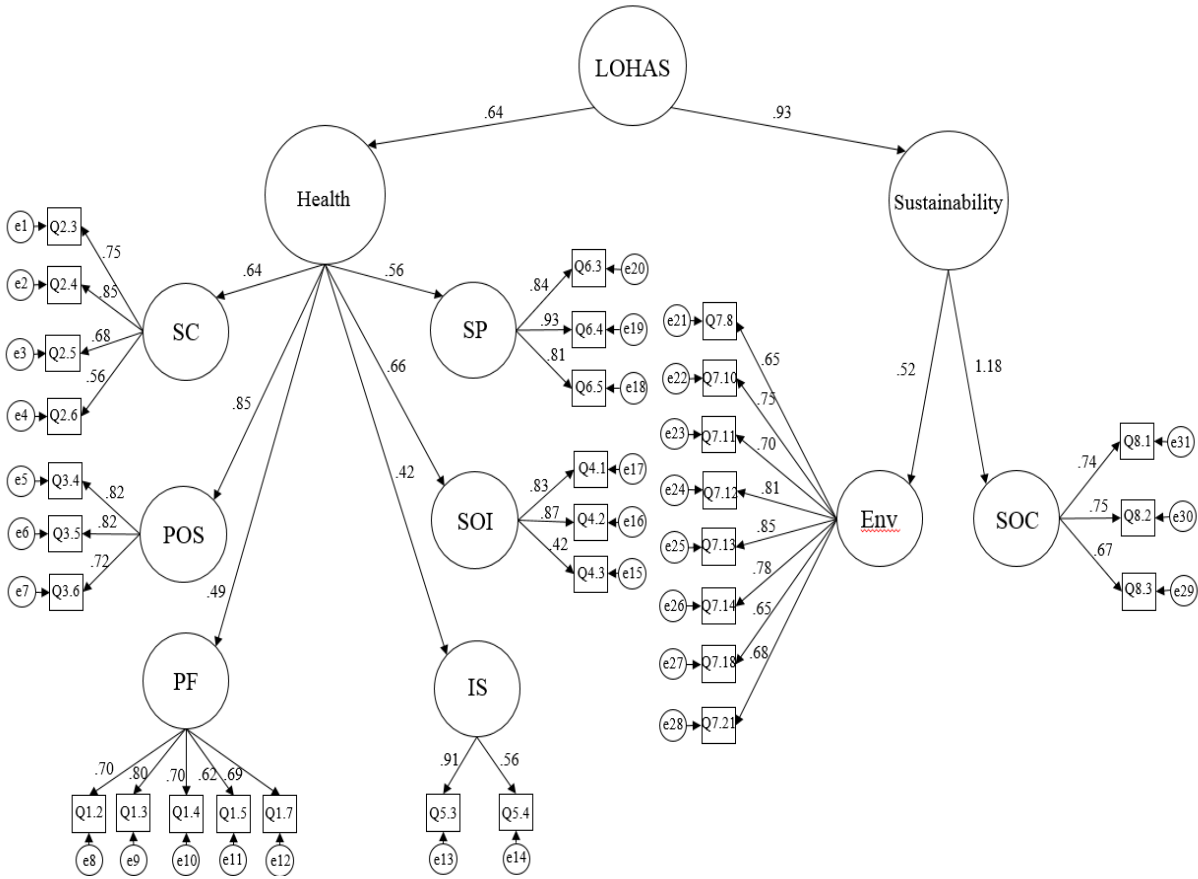


Figure 7. CFA model and results of the third-order factor LOHAS scale

## Results

The result of the confirmatory factor analysis is presented in Figure 6. In general, it is expected that a factor loading lies between 0 and 1, but the estimate between a factor of sustainability and that of social consciousness (SOC) is 1.18, which is called ultra-Heywood case. The ultra-Heywood case implies that some unique factor has a negative variance. The possible causes of the Heywood cases include an inappropriate fit of the common factor model to the data, bad prior communality estimates, too many or few common factors, insufficient data to provide stable estimates, sampling fluctuations, indefiniteness of the model (Van Driel, 1978; SAS/STAT(R) 9.3 User's Guide, 2011).

I examined the variances of the factors of “sustainability” and “SOC” and the factor loadings and variances of each observed variable Q8.1-Q8.3. It was found that all the factor

loading estimates were above cut-off (Q8.1=.74, Q8.2=.75, Q8.3=.67) and the variance of “Sustainability” was positive ( $\sigma^2=.02$ ) but the variance of the ‘SOC’ was negative ( $\sigma^2= -.192$ ).

To find out a reason for the Heywood case, prior communality estimates for the items Q8.1-8.3 were checked, but they all were above the cut-off point of .07. Furthermore, the overall model fit of the hierarchical factor model was found to be good ( $\chi^2_{(422)} = 975.332, p < .001$ , CFI=.915, TLI=.906, RMSEA=.055). Therefore, the possible causes of the Heywood case in this case might be too few sub-factors for ‘sustainability’ or not enough data to provide stable estimates. Table 25 shows a summary of the reliability of the third-order factor structure of the LOHAS scale.

Table 25. Reflective model of LOHAS (Pooled sample)

	CR	Reflective factor loading		
		1st	2nd	3 <sup>rd</sup> (LOHAS)
Health				.64
Stress control			.64	
1. I try to control stress	.75	.75		
2. I reduce stress and anxiety		.85		
3. I use specific methods to control my stress		.68		
4. I spend time each day trying to reduce accumulated stress		.56		
	CR	Reflective factor loading		
		1st	2nd	3 <sup>rd</sup> (LOHAS)
Positivity			.85	
1. I try to take positive outlook on things	.56	.82		
2. I think positively of life		.82		
3. I try to cope with positively on failure and frustration		.72		
Physical fitness			.49	
1. My daily meals are nutritionally balanced	.79	.70		
2. I purchase and eat foods considering my health		.80		
3. I limit foods like sugar, coffee, fats, etc.		.70		
4. I choose a diet low in fat, saturated fat, or cholesterol		.62		
5. I avoid foods with high additives		.69		
Spirituality			.56	
1. I feel connected with some force greater than myself	.81	.84		
2. I nurture the spiritual aspects of myself		.93		
3. I spend portion of everyday in prayer, meditation, or personal reflection		.81		

Table 25 continued

Social interaction			.66	
1. I am close with family, friends, colleagues, and neighbors	.68	.83		
2. I have good and meaningful relationship with others		.87		
3. I attend club or social activities on a regular basis		.42		
Intellectual stimulation			.42	
1. I read about different topics from a variety of newspapers, magazines and books	.50	.91		
2. I have generally found intellectual challenges to be vital to my overall well-being		.56		
Sustainability				.93
Environmentalism			.52	
1. I am interested in renewable energy sources	.88	.65		
2. I prefer products made of recycled materials		.75		
3. My purchase decisions are based on its effect on the world		.70		
4. I choose environmentally friendly products		.81		
5. I prefer products manufactured in sustainable ways		.85		
6. I choose sustainable source products over conventional ones		.78		
7. I teach the benefits of environmentally friendly products to family or friends		.65		
	CR	Reflective factor loading		
		1st	2nd	3 <sup>rd</sup> (LOHAS)
8. I would be willing to reduce my consumption to help protect the environment		.68		
Social consciousness			1.18	
1. I am socially conscious	.75	.74		
2. I consider local society and its members in daily life		.75		
3. I consider the entire world and population in daily life		.67		

## CHAPTER 5. DISCUSSION

### 5.1 Summary of results

The purpose of the current study was to develop a cross-culturally reliable and valid standard LOHAS scale. As the first step in this study, literature research was conducted to specify the domains of LOHAS. Eight sub-dimensions were identified, and they were (1) physical health (2) mental health (3) emotional health (4) spiritual health (5) social health (6) intellectual health (7) environmental sustainability (8) social sustainability

Secondly, initial LOHAS measuring items were generated in SK and its content validity was evaluated using a Delphi technique. As a result, seventeen items were selected. Additionally, fifty-one questions that were considered to reflect the attributes of the LOHAS lifestyle were adopted from past research. All these items were combined with the original twelve LOHAS measuring items by NMI, and finally, a total of eighty questions was chosen to undergo psychometric analysis.

Thirdly, item purification was conducted in three distinct multicultural populations of SK students, U.S. students, and U.S. general population. Scale items were obtained for seventy items in SK student, fifty-five in U.S. students, and sixty-six in U.S. general population. The individual LOHAS scales in each group were subjected to exploratory factor analysis (EFA). The underlying factor structures of the LOHAS scale in each group were compared to test cross-cultural universality of the scale: for SK student sample, eight factors were identified with thirty-five items, including ‘positivity and enjoyment’, ‘environmentalism’, ‘physical fitness’, ‘stress control’, ‘spirituality’, ‘social interaction’, ‘social consciousness’, and ‘socially responsible purchase’. For U.S. student sample, eight factors emerged with thirty-nine items, including ‘positivity’, ‘enjoyment’, ‘environmentalism’, ‘physical fitness’, ‘stress control’, ‘spirituality’, ‘social consciousness’, and ‘socially responsible purchase’. For U.S. general population, seven factors were revealed with thirty-seven items, including ‘positivity and enjoyment’, ‘environmentalism’, ‘physical fitness’, ‘stress control’, ‘spirituality’, ‘social consciousness’, and intellectual stimulation. Then, confirmatory factor analysis (CFA) followed, and it confirmed that the LOHAS scale shows different factor structures in three different groups.

To see if a LOHAS scale that is derived from the common items to three different groups shows cross-cultural equivalence, multi-group confirmatory factor analysis (MGCFA) was conducted. Twenty-five common items that loaded across six common dimensions (i.e., environmentalism (6 items), physical fitness (3 items), stress control (4 items), positivity (6 items), social consciousness (3 items), and spirituality (3 items)) were used. It was found that the common items-derived scale shows reliability in U.S. students and U.S. general population but not in SK students. Besides, the scale showed discriminant validity in U.S. students and the U.S. general population but not in SK students. In sum, the common item-derived LOHAS scale did not show cross-cultural universality.

As an alternative way to develop a globally standard LOHAS scale, this study tried to develop a scale based on the pooled data; the initial eighty LOHAS items went through psychometric analysis with a combined sample of SK students, US students, and US general public. Item purification generated sixty-five items with acceptable reliability. EFA produced thirty-one items with eight underlying dimensions: ‘environmentalism’, ‘physical fitness’, ‘stress control’, ‘positivity’, ‘spirituality’, ‘social interaction’, ‘social consciousness’, ‘intellectual stimulation’. CFA confirmed eight-dimensionality and reliability of the scale. Although AVEs of ‘physical fitness’ and ‘intellectual stimulation’ were slightly below the criteria, the two dimensions were decided to remain, considering that 1) this study is the first exploratory study of the theoretical model-testing, 2) it does not make serious convergent and discriminant validity problems, and 3) the attributes of the LOHAS scale are more clearly described by the inclusion of the two factors, enhancing the face and content validity.

Then, the validity test followed. As to convergent validity test, all items were found to load on the respective factors with acceptable loadings except for the item of ‘I attend a club or social activities on a regular basis’. Although the item loading was slightly below the cut-off, it was decided to keep the item in the ‘social interaction’ factor given that 1) the item measures an essential attribute of the ‘social interaction’ factor 2) cross-loading issue did not appear 3) AVE and CR values of the ‘social interaction’ factor were adequate with the inclusion of that item 4) some psychometrist recommended to be more careful when deleting items.

For discriminant validity test, AVE of each dimension was found to be greater than the squared correlation of a factor with any other factor in LOHAS except for ‘intellectual stimulation’. AVE of ‘intellectual stimulation’ and the squared correlation of that factor with

‘social consciousness’ was equivalent, indicating that there might be a correlation between the two factors.

In regard to the hierarchical factor structure test, it was found that the LOHAS construct consists of a third-order factor structure. This means that the first-order eight factors of environmentalism, physical fitness, stress control, positivity, spirituality, social interaction, social consciousness, and intellectual stimulation are the reflection of the two second-order factors of health and sustainability, and these second-order factors are the reflection of third-order construct of LOHAS. Ultra-Heywood case emerged between the second-order factor of ‘sustainability’ and the first-order factor of ‘social consciousness’ possibly due to insufficient data for a stable estimate or a too small number of sub-factors of ‘sustainability’.

Concerning the nomological validity test, it was identified that the future time orientation is a significant predictor of the LOHAS lifestyle. Specifically, the more an individual is future-oriented, the individual is more likely to be a LOHASian; the one who has future time perspective was more likely to show environmentally friendly and socially responsible behavior, be inclined to care about one’s physical health, control stress, feel positive emotions, engage in spiritual activity, be involved in social interaction, and enjoy intellectual stimulation. Furthermore, the LOHAS lifestyle was found to be somewhat related to status consumption. ‘Social interaction’ had a positive effect on status consumption, ‘physical fitness’ negatively affected status consumption, ‘spirituality’ was associated with status consumption in a positive way.

With reference to the criterion validity test, the scale’s predictive validity was established. The discriminant analysis found that the scale can discriminate between high and low LOHAS group. All the eight sub-dimensions of LOHAS were revealed as significant predictors for the identification of the LOHAS group; the more one has a high score in each dimension, the one is more likely to be a LOHASian. Also, the scale exhibited behavioral predictive validity. Consumption patterns were different between high and low scores on the LOHAS scale. The different consumption patterns appeared, particularly in a grocery shopping context. Specifically, members in high LOHAS group were willing to pay a price premium for environmentally and socially certified products such as apple, drink, and coffee. However, the tendency did not appear in other shopping categories of electronics and household goods.



## 5.2 Implications of findings

This research provides theoretical contributions in a number of ways. First, this study extends the emerging literature on LOHAS. Most existing research in this domain has focused on the unidimensionality of LOHAS, particularly on environmentalism (e.g., cowan & Kinley, 2014; Kim, Lee, Kim, & Kim, 2013; Park, 2015; Wan & Toppinen, 2016) with lack of a well-defined theoretical foundation. However, the present research reveals that LOHAS is a multi-dimensional concept, comprising eight dimensions of physical fitness, stress control, positivity, spirituality, social interaction, intellectual stimulation, environmentalism, and social consciousness. While existing scales of LOHAS have been unidimensional and unable to capture a broad nature of LOHAS, this new scale reflects the complexity and conceptual richness of LOHAS. In this sense, the current research goes beyond existing literature by expending a theoretical understanding of LOHAS.

Second, commonalities and differences of the LOHAS factor structure across cultures enrich the LOHAS framework. Individual CFAs in each group discover that people from different cultural groups understand LOHAS in the six-dimensional framework in common (i.e., environmentalism, physical fitness, stress control, social consciousness, spirituality, positivity), but conceptualize LOHAS in a somewhat different way. Specifically, ‘social interaction’ emerged as a significant dimension in the SK students’ sample. This may possibly be explained by collective orientation in eastern culture (Brewer & Chen, 2007). Collectivism culture emphasizes a sense of community or fundamental importance of social relationships (Bellah, Madsen, Sullivan, Swidler, & Tipton, 2007; Yum, 1998). Since the common welfare of the group is often put before the goals of individual members, people tend to adjust themselves to the group and easily submit to the demands of the group (Bellah et al., 2007).

SK students also perceive ‘socially responsible purchase’ as an important dimension in LOHAS. Members in eastern culture tend to have idealistic moral philosophy, which is associated with firm moral conviction (Forsyth, O’boyle, & McDaniel, 2008). The strong sense of moral obligation may lead them to a socially responsible purchasing decision. Another interpretation may be available such that people in the eastern culture are more socially oriented, and this makes them be more socially conscious, sensitive to social problems and buying products that are responsive to the problems (Webster Jr, 1975; Yang, 1981).

Third, the scale established in this research offers a new standard measuring criterion for LOHAS. The scale is well validated, has well-established psychometric qualities, and offers multifaced assessments of LOHAS that are theoretically grounded. Therefore, the scale contributes to the generation of reliable and valid findings in LOHAS research. Consistent use of the same scale will allow comparison of findings and replication of research, reinforcing the LOHAS theory.

The current research also offers a number of applications for business practitioners. Managers in the business area could use this scale as a market segmentation tool. Given that the new scale can provide marketers with a means of empirically assessing the level of LOHAS orientation, it will help identify the LOHAS segment and describe its characteristics. The scale can allow reliable research on psychological mechanism or consumption behavior of the LOHAS consumers, which provides deep insights into the development of new products or services that appeal to the LOHAS consumers. Also, firms could utilize the LOHAS concept to create a positive corporate image, which has a significant impact on the intention to purchase products associated with that company.

### **5.3 Limitations and future directions**

This study has several unsolved issues. First, a global LOHAS scale developed in the pooled data set may further need to undergo measurement invariance test in different national settings. For the LOHAS theory made in this research to be generalized, it is required that the LOHAS framework exhibits cross-national equivalence. Assessment of the level of equivalence across the different settings will help to reveal that to what degree the scale is robust in comparing similarities/differences between groups (Milfont & Fischer, 2010).

Second, the nomological validity of the global scale remains inconclusive. Some model fit indices were satisfied, but others didn't. It will need to investigate what makes the model fail to meet the criteria of all indices. Also, it might be beneficial to relate the LOHAS construct to other theoretically grounded antecedents and consequences.

Third, further attention needs to be given to the reasons for the differences in the conceptualization of LOHAS in different population/cultural settings. For example, only the students than general public perceived that 'socially responsible purchase' is an important dimension in LOHAS, which is contradictory to the previous literature arguing that ethical

purchasing behavior tends to be more explained by the general population than students (e.g., Carrigan, Szmigin, & Wright, 2004; De Pelsmacker, Janssens, Sterckx, & Mielants, 2006; Schlegelmilch, Bohlen, & Diamantopoulos, 1996).

Besides, a slight difference in the conceptualization of LOHAS was found between the students and the general population in the U.S. It might be useful to examine if socio-demographic variable could be a significant factor that explains the differences. Furthermore, it may be worthwhile to examine the interaction of cultural values and the LOHAS lifestyle to obtain deep insight into the root of differences in LOHAS across different cultural settings.

Finally, this research used an SK sample of SK students in the U.S. instead of those in SK. It might be possible for SK students living in the U.S. to have been acculturated in the U.S. and therefore their perception has changed. However, it was assumed in this research that the SK students in the U.S. and those in SK have the same background and share similar views. Thus, future research is recommended to collect an SK sample from SK and see if the LOHAS lifestyle proceeds in the same way with that in SK students in the U.S.

## **5.4 More topics to think about**

### **5.4.1 Impact of life course on LOHAS behavior**

There are some possible explanations about why LOHAS orientation does not translate into healthy and pro-environmental behavior (value-action gap). One reason for the gap may be the neglect of social psychological factors that are embedded in the actions. For example, participation in the environmental movement is influenced by people's work and social networks (e.g., Diani & McAdam, 2003), and environmental behaviors are shaped by social norms, family lives, and nature experiences (e.g., Chawla, 1999; Tindall, Davies, & Mauboules, 2003).

The second reason is concerned with temporal issues; pro-environmental behavior develops throughout the life-course. Events or experiences that occur during the life stage can change motivators and barriers of the LOHAS behavior. For example, a level of the pro-environmental behavior may increase once women get married because they prioritize health of their family and respond actively to environmental threats to their family (Blocker & Eckberg, 1989; Davidson & Freudenburg, 1996; Hamilton, 85). Parenting may also constrain one's availability and disposable time for environmental activism. Particularly if women are employed

full-time, their duties and roles for domestic work and child care lower their ‘biographical availability’ to participate in the environmental movement (Tindall et al., 2013).

On the other hand, some studies emphasize the identity related factors in pro-environmental behavior. Identity factors are influenced by the life stage. One in early adulthood may assert their ethical principles despite the family’s opposition because people in that life stage begin to seek independence from their parents and express their own identity (Baumrind, 1991). One may choose to live as vegetarian to protect animal right even though it is not supported by working class family (Hards, 2012). A feeling of empowerment enables individuals to choose what they ought or not to.

Exposure to nature experience in the early life stage also affects environmental attitudes and behaviors. Well and Lekies (2006) examined association between childhood involvement with nature and adult environmentalism. People who reported having participated in wild nature (e.g., hiking, camping, and hunting) or domestic nature (e.g., flowers and planning) in childhood had more responsible attitude toward the environment and they showed stronger pro-environmental behavior. Ewert, Place, and Sibthorp (2005) investigated the effect of early-life outdoor experience on one’s environmental beliefs. Appreciative outdoor activities (e.g., time spent with nature), consumptive outdoor activities (e.g., fishing and hunting), media exposure (e.g., books or TV), and witness of the negative environmental events (e.g., watching outdoor areas being developed) were predictive of eco-centric/anthropocentric beliefs.

#### **5.4.2 Product lifecycle and LOHAS behavior**

The product lifecycle is defined in various ways. First, it designates the entire life cycle of the product or service from production, utilization to disposal (Tsuda, Hara, & Uwasu, 2013). The usage phase is strongly tied to pro-environmental behavior (e.g., Sorrentino, Woelbert, & Sala, 2016). Consumption reduction, green product choice, and lifestyle changes are the ways that reduce the negative impact on the environment in the usage stage. Lifecycle assessment (LCA) has been used to estimate the environmental consequences of individual behavior. In the study on the validation of the self-report measure of ecological behavior, Kaiser, Doka, Hofstetter, and Ranney (2003) evaluated the degree to which each behavior in the measure is environmentally effective. They compared the environmental consequences of each behavior with those of alternative behavior using LCA database. For example, they contrasted

consumption behavior of energy-efficient bulbs versus conventional/halogen bulbs. Although energy-efficient bulbs require more energy for production, they revealed that energy efficient bulb is more environmentally effective given that it emits less amount of mercury when discarded and it requires less power while emitting equal amount of light.

When product lifecycle is discussed in the marketing, it describes the stages that products/services go through from when it is first introduced until it is removed from the marketplace (Levitt, 1965). LOHAS consumers participate in early stage of product lifecycle (i.e., introduction stage). As an early adopter, they constantly seek and try new green products. They also encourage others to try new products that are the most credible (NMI, 2008). Their opinions are influential and respected by other consumer segments, so they help push innovative eco-products into the main stream in the market (NMI, 2008).

Furthermore, they are open to gather information about the new products through a variety of channels because it helps to reduce the risk for the first use of a product when it becomes available. They use the channels of samples, blogs, news, PR, which reflect early adopter mentality, as well as the traditional sources (e.g., TV, magazine). Promotion strategy in the introduction stage (e.g., consumer test, samples/trials) facilitates their usage of innovative products (NMI, 2008).

### **5.4.3 Good and evil of LOHAS**

LOHAS is a representation of potential needs. LOHAS consumers feel engaged in sustainable issues and believe that they improve the world by expressing their values through purchase behavior (NMI, 2008). LOHAS business provides them with participation for a better society. Furthermore, LOHAS makes the connections that help the industry to advance in a positive direction. Businesses at a different level have their role and responsibility in the broad LOHAS market. The different fractions-from big businesses researching market opportunities to smaller companies that focus on supporting community-can communicate each other based on the mission that they need to change for the greater good (Ning, 2012).

On the other hand, LOHAS can be another form of hyper consumerism (Gelfer, 2010). LOHAS is not completely sustainable in terms of consumption reduction (Kreeb, Motzer, & Schulz, 2008). For example, the authenticity of spirituality is commercialized in the LOHAS marketplace to serve profit. Spiritualized products and services grow the economy of the

personal development segment (Gelfer, 2010). Also, LOHAS is limited to those who have financial means and to wealthy society (Szakály, Popp, Kontor, Kovács, Pető, & Jasák, 2017). Aesthetics, quality, and style of life are the utmost importance, and environmental aspects are undercurrent in the consumption of sustainable products (Kreeb et al., 2008). LOHAS consumers are not reluctant to luxuries, and they establish a solid identity through what they buy instead of how less they consume. LOHAS is a novel phenomenon that permits consumption without a guilty conscience (Bilharz & Schmitt, 2011).

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## APPENDIX A. SURVEYS

This survey is intended to measure lifestyle of health and sustainability. Please take a moment to think of your lifestyle when answering the following questions and check the number that most closely matches your opinion. Your identity and response will be kept confidential.

1. To what extent do **you agree with the following statements**? Please **select the number** that most closely matches your lifestyle.

	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree				
1	I exercise regularly				1	2	3	4	5
2	My daily meals are nutritionally balanced				1	2	3	4	5
3	I purchase and eat foods considering my health				1	2	3	4	5
4	I eat variety of wholesome, minimally processed foods				1	2	3	4	5
5	I limit foods like sugar, coffee, fats, etc				1	2	3	4	5
6	I choose a diet low in fat, saturated fat, or cholesterol				1	2	3	4	5
7	I moderate my red meat consumption				1	2	3	4	5
8	I cut back on snacks and treats				1	2	3	4	5
8	I avoid foods with high additives				1	2	3	4	5
10	I worry that there are harmful chemicals in my food				1	2	3	4	5
11	I eat lots of fruits, vegetables and grains				1	2	3	4	5
12	I drink plenty of water everyday				1	2	3	4	5
13	I usually read the ingredients on food labels				1	2	3	4	5
14	I restrain myself to use harmful products such as drug, cigarette or alcohol.				1	2	3	4	5
15	I maintain a healthy body weight				1	2	3	4	5
16	I take vitamins and mineral supplements regularly				1	2	3	4	5
17	I actively participate in physical examination personally or in workplace.				1	2	3	4	5
18	I see a doctor for a regular checkup				1	2	3	4	5
19	Eating right, exercising, and taking preventive measures will keep me healthy for life				1	2	3	4	5
20	My health depends on how well I take care of myself				1	2	3	4	5

2. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

21	I take some time for relaxation each day	1	2	3	4	5
22	I practice relaxation or meditation for 14-20 minutes daily	1	2	3	4	5
23	I try to control stress.	1	2	3	4	5
24	I reduce stress and anxiety	1	2	3	4	5
25	I use specific methods to control my stress	1	2	3	4	5
26	I spend time each day trying to reduce accumulated stress	1	2	3	4	5
27	I practice yoga 3 times a week	1	2	3	4	5

3. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

28	I am able to speak openly about my feelings when angry or worried	1	2	3	4	5
29	I try to control emotion	1	2	3	4	5
30	I am not incapacitated by my emotions of fear, anger, love, jealous or guilt	1	2	3	4	5
31	I do something just for fun at least once a week	1	2	3	4	5
32	I try to take positive outlook on things	1	2	3	4	5
33	I think positively of life	1	2	3	4	5
34	I try to cope with positively on failure and frustration	1	2	3	4	5
35	I participate in everything with zeal.	1	2	3	4	5
36	I get satisfaction from simple, everyday pleasures	1	2	3	4	5

4. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

37	I am close with family, friends, colleagues and neighbors	1	2	3	4	5
38	I have good and meaningful relationship with others	1	2	3	4	5
39	I attend club or social activities on a regular basis	1	2	3	4	5
40	I volunteer for the poor or local society.	1	2	3	4	5
41	I try to become a necessary being in society	1	2	3	4	5

5. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

42	I pursue self-development continuously.	1	2	3	4	5
43	I enjoy new experiences and challenges.	1	2	3	4	5
44	I read about different topics from a variety of newspapers, magazines and books	1	2	3	4	5
45	I have generally found intellectual challenges to be vital to my overall well-being	1	2	3	4	5
46	I try to share positively my knowledge or experiences with others	1	2	3	4	5

6. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

47	I feel I am growing and changing in positive ways	1	2	3	4	5
48	I believe that my life has purpose	1	2	3	4	5
49	I know meaning of life and I have my own goal for it	1	2	3	4	5
50	I work toward long-term goals in my life	1	2	3	4	5
51	I feel connected with some force greater than myself	1	2	3	4	5
53	I nurture the religious/spiritual aspects of myself	1	2	3	4	5
54	I spend portion of every day in prayer, meditation, or personal reflection	1	2	3	4	5
55	I feel sense of connectedness with other human beings	1	2	3	4	5
56	I share feelings of joy, love and peace with others	1	2	3	4	5
57	I am friendly to others and try to help them when they suffer	1	2	3	4	5

7. To what extent do **you agree with the following statements?** Please **select the number** that most closely matches your lifestyle.

1                      2                      3                      4                      5  
Strongly              Disagree              Neutral              Agree              Strongly agree  
disagree

58	I protect the environment.	1	2	3	4	5
59	I prefer sustainable agriculture practices	1	2	3	4	5
60	I buy organically grown produce	1	2	3	4	5
61	I buy organic food products	1	2	3	4	5
62	I buy seasonal and fresh food products	1	2	3	4	5
63	I buy locally produced food products	1	2	3	4	5
64	If I can choose between imported and domestically cultivated food products, I prefer domestic products	1	2	3	4	5
65	I raise organic fruit and vegetables	1	2	3	4	5
66	I avoid buying products from companies that harm animals	1	2	3	4	5
67	I avoid buying products from companies that harm plants	1	2	3	4	5
68	I use energy efficiency light bulbs	1	2	3	4	5
69	I use energy efficiency electrical appliances	1	2	3	4	5
70	I conserve energy by truing off the lights	1	2	3	4	5
71	I turn off electronics when not in use	1	2	3	4	5
72	I reduce water heater temperature	1	2	3	4	5
73	I control thermostat to conserve energy	1	2	3	4	5
74	I try to turn off the air conditioner and open the windows to reduce hazardous gases destroying air	1	2	3	4	5
75	I keep heating low to save energy	1	2	3	4	5
76	I cut back on driving a car for environmental reasons.	1	2	3	4	5
77	I walk or ride a bike short distances to alleviate air pollution	1	2	3	4	5
78	I use public transportation rather than the car	1	2	3	4	5
79	Whenever possible, I car pool	1	2	3	4	5
80	I use unleaded gasoline in my automobile	1	2	3	4	5
81	I am interested in renewable energy sources	1	2	3	4	5
82	I reuse paper, glass or plastic container	1	2	3	4	5
83	I recycle paper, cans, glasses or plastic container	1	2	3	4	5
84	I prefer products made of recycled materials.	1	2	3	4	5
85	My purchase decisions are based on its effect on the world.	1	2	3	4	5
86	I choose environmentally friendly products.	1	2	3	4	5
87	I prefer products manufactured in sustainable ways	1	2	3	4	5
88	I choose sustainable-source products over conventional ones	1	2	3	4	5
89	I have purchased products because they cause less pollution.	1	2	3	4	5
90	I buy recycled paper goods	1	2	3	4	5
91	When shopping, I prefer paper bags to plastic ones	1	2	3	4	5
92	I reduce use of disposable products	1	2	3	4	5
93	I prefer packaging that contain renewable or compostable martials	1	2	3	4	5
94	I minimize the use of restricted or hazardous materials contained in the product	1	2	3	4	5
95	Before purchase, I consider if the product would be easily disassembled for repair or reuse	1	2	3	4	5
96	I bring my own bag when shopping	1	2	3	4	5
97	I avoid excessive packaging	1	2	3	4	5
98	I compost kitchen or garden waste	1	2	3	4	5
99	I try to reduce household waste	1	2	3	4	5

100	I turn tap off while brushing teeth, washing hands or washing dishes	1	2	3	4	5
101	I use water saving devices such as low-flow showerheads and faucet aerators	1	2	3	4	5
102	I conserve water while washing my car	1	2	3	4	5
103	I use a sprinkler less in the garden	1	2	3	4	5
104	I use environmentally friendly detergent	1	2	3	4	5
105	I often talk with friends about environmental issues	1	2	3	4	5
106	I teach the benefits of environmentally friendly products to family or friends.	1	2	3	4	5
107	I subscribe to the environmental magazine	1	2	3	4	5
108	I have paid premium for environmentally friendly products	1	2	3	4	5
109	I am willing to pay an additional 20% for sustainably manufactured products	1	2	3	4	5
110	I believe that my small practices can make a difference in addressing environmental protection	1	2	3	4	5
111	I would be willing to reduce my consumption to help protect the environment	1	2	3	4	5

8. To what extent do **you agree with the following statements**? Please **select the number** that most closely matches your lifestyle.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

112	I'm socially conscious.	1	2	3	4	5
113	I consider local society and its members in daily life.	1	2	3	4	5
114	I consider the entire world and population in daily life	1	2	3	4	5
115	I buy products from companies with values like my own	1	2	3	4	5
116	I buy Fairtrade products	1	2	3	4	5
117	When purchasing products, I depend on whether a company perceives its own social responsibility	1	2	3	4	5
118	I avoid buying products or services made from companies that use child labor	1	2	3	4	5
119	I avoid buying products or services made from companies that use sweatshop labor	1	2	3	4	5
120	I avoid buying products or services made from companies that discriminate against women	1	2	3	4	5
121	I avoid buying products or services from companies that discriminate against minorities	1	2	3	4	5
122	I would pay premium to buy the products of a company that shows ethically and socially responsible practices	1	2	3	4	5
123	I believe that my small efforts can contribute to increasing well-being of our society	1	2	3	4	5